

Technical Support Document

Notice of Proposed Rulemaking

on the

Serious Area PM-10 State Implementation Plan
for the Maricopa County PM-10 Nonattainment Area

Provisions for Attaining the 24-Hour Standard

and Contingency Measures

September 14, 2001

Air Division

U.S. Environmental Protection Agency - Region 9

This document has been prepared by

Air Division

Scott Bohning
Karen Irwin
Roxanne Johnson
Colleen McKaughan
Karina O'Connor
Robert Pallarino
John Ungvarsky
Frances Wicher

Office of Regional Council

Jan Taradash

U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California 94105

The Rulemaking Docket

Documents from the docket for this rulemaking can be obtained by contacting Frances Wicher at (415) 744-1248 or wicher.frances@epa.gov. Please request docket #AZ-MA-00-001. A fee may be charged for copying documents in the docket.

Technical Support Document
MAG Serious Area PM-10 State Implementation Plan
Provisions for Attaining the 24-Hour Standard
& Contingency Measures

Table of Contents

Section 1 -- Introduction, Proposed Findings, and Background Information	1
This Document's Purpose	1
Action on the MAG Serious Area PM-10 Plan's Provisions for the Annual Standard	1
Summary of EPA's Findings on the Serious Area PM-10 Plan's Provisions for the 24-Hour Standard	1
Summary of the MAG Serious Area PM-10 Plan	2
How the MAG Plan Relates to other PM-10 Plans for the Maricopa Area	4
Relationship of the 1997 Microscale Plan to the 2000 MAG Plan and BMP SIP	8
Who to Contact for More Information	9
Section 2 – The Completeness Determination	11
Completeness Determinations	11
Completeness Determinations on the Revised MAG Plan	11
Section 3 – CAA & EPA Policy Requirements for Serious Area PM-10 Plans	21
Separating Our Rulemakings on the Annual and 24-hour Standards	21
Planning Requirements for Serious PM-10 Nonattainment Areas	23
Implementation of Best Available Control Measures	25
Implementation of Reasonably Available Control Measures	27

Extension of the Attainment Date beyond 2001	28
The Clean Air Act Requirements for Attainment Date Extensions	28
EPA's Proposed Policy on Attainment Date Extensions	29
1. Apply for an attainment date extension	29
2. Demonstrate that attainment by 2001 is impracticable	29
3. Have complied with all requirements and commitments in its implementation plan	30
4. Demonstrate the inclusion of the most stringent measures	31
5. Demonstrate attainment by the most expeditious alternative date practicable	36
Section 4 – Detailed Evaluation of the MAG Serious Area PM-10 Plan	38
Baseyear and Modeling PM-10 Emissions inventories	41
Ambient Air Quality Surveillance	56
BACT for Major Stationary Sources of PM-10 Precursors	63
BACT for Significant Stationary Sources of PM-10	67
BACM Analysis – Step 1, Develop an Emissions inventory	69
BACM Analysis – Step 2, Model to Identify Significant Sources	72
Implementation of BACM and Inclusion of MSM for On-Road Motor Vehicle Exhaust (Technology Standards and Fuels)	88
Implementation of BACM and Inclusion of MSM for On-Road Motor Vehicle Exhaust and Paved Road Dust (TCMs)	107
Implementation of BACM and Inclusion of MSM for Nonroad Engines	122
Implementation of BACM and Inclusion of MSM for Paved Road Dust	133
Implementation of BACM and Inclusion of MSM for Unpaved Parking Lots	147
Implementation of BACM and Inclusion of MSM for Disturbed Vacant Land	155
Implementation of BACM and Inclusion of MSM for Unpaved Roads	165
Implementation of BACM and Inclusion of MSM for Construction Activities and Sites	178

Implementation of BACM and Inclusion of MSM for Agricultural Sources	191
Implementation of BACM and Inclusion of MSM for Residential Wood Combustion	210
Implementation of BACM and Inclusion of MSM for Sources of Secondary Ammonium Nitrate	217
MCESD's Commitments to Improve Compliance and Enforcement of the Fugitive Dust Program	220
Extension Request – Application	225
Extension Request – Demonstrate the Impracticability of Attainment by December 31, 2001	227
Extension Request – Complied with All Requirements and Commitments in Its Implementation Plan	234
Extension Request – Demonstrate the Adoption of the Most Stringent Measures	237
Extension Request – Demonstrate Attainment by the Most Expeditious Alternative Date Practicable after December 31, 2001	244
Air Quality Modeling	245
Attainment Demonstration Control Measures	272
Extension Request – Other Factors that EPA May Consider in Granting an Extension Request	283
Summary of Proposed Findings on Arizona's Extension Request	286
Reasonable Further Progress and Quantitative Milestones	287
Contingency Measures	299
General SIP Requirements: Adequate Personnel, Funding, and Authority	305
Description of the Enforcement Methods and State Back-Up Authority	308

Technical Support Document

Serious Area PM-10 State Implementation Plan

for the Maricopa County PM-10 Nonattainment Area

Provisions for Attaining the 24-Hour Standard

and Contingency Measures

Section 1 -- Introduction, Proposed Findings, and Background Information

This Document's Purpose

In this technical support document, we provide information supporting our proposed findings that the serious area plan for the Maricopa County (metropolitan Phoenix, Arizona) PM-10 nonattainment area meets the Clean Air Act (CAA) requirements for attaining the 24-hour PM-10 standard.

In this technical support document, we

- summarize the statutory and policy requirements for serious area PM-10 nonattainment area plans,
- describe our analysis of the serious area PM-10 plan for the Phoenix area including all submittals for that plan received to date, and
- provide our proposed conclusions on the approvability of this serious area plan.

Action on the MAG Serious Area PM-10 Plan's Provisions for the Annual Standard

There are two PM-10 national ambient air quality standards (NAAQS), an annual standard of 50 $\mu\text{g}/\text{m}^3$ and a 24-hour standard of 150 $\mu\text{g}/\text{m}^3$. In this action, we are proposing to approve the MAG plan's provisions for attainment of the 24-hour PM-10 standard. We have already proposed to approve the plan's annual standard provisions. See 65 FR 19964 (April 13, 2000). In the annual standard proposal and later in this TSD, we discuss the legal basis for separating the proposed approvals for the 24-hour and annual standards and the practical reason we chose to do so. See 65 FR 19964, 19969 and section 3 of this TSD. It is our intent, however, to finalize actions on both standards in a single rulemaking.

Summary of EPA's Findings on the Serious Area PM-10 Plan's Provisions for the 24-Hour Standard

We are proposing to approve the provisions in the MAG serious area plan that address CAA requirements for the 24-hour PM-10 standard and to grant a 5 year extension of the attainment date for that standard. Table 1-1 summarizes our proposed actions by CAA requirement.

TABLE 1-1 PROPOSED ACTIONS ON THE REVISED MAG SERIOUS AREA PM-10 PLAN 24-HOUR PROVISIONS		
FOR THIS REQUIREMENT...	REQUIRED BY THIS SECTION OF THE CLEAN AIR ACT...	WE ARE PROPOSING TO...
Implementation of RACM/BACM	189(a)(1)(C) and 189(b)(1)(B)	approve
Impracticability of attainment by 2001 demonstration	189(b)(1)(A)	approve
Attainment by the expeditious alternative date	189(b)(1)(A)	approve
BACT on major sources of PM-10 precursors	189(e)	approve
RFP/Milestone demonstration	172(c)(2) and 189(c)	approve
Attainment date extension request	188(e)	grant extension to December 31, 2006
Contingency Measures (24-hour and annual)	172(c)(9)	approve

As part of the annual standard proposal, we have proposed to approve the base year regional emissions inventory required by section 172(c)(3) and the transportation conformity budget required by section 176(c). We also proposed to approve the commitments by the cities, towns and County of Maricopa in the plan to implement control measures, MCESD's Rules 310 and 310.01, and Maricopa County's Residential Woodburning Ordinance. We are not repeating those proposals here.

Summary of the MAG Serious Area PM-10 Plan

Elements of the serious area PM-10 plan for Maricopa County are found principally in four documents: the 1997 Microscale plan, the 1997 Control Measure submittal, the 2000 revised MAG plan, and the 2001 Best Management Practices submittal. The latter three documents are the subject of this proposal and are described in more detail below in order of importance. We have already acted on the Microscale plan, see 62 FR 41856 (August 4, 1997).

The first document is the *Revised Maricopa Association of Governments 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area*, February 2000.

This plan was developed by the Maricopa Association of Governments (MAG), the lead air quality planning agency in Maricopa County. The Arizona Department of Environmental Quality (ADEQ) submitted this plan as a revision to the Arizona State Implementation Plan (SIP) on February 16, 2000. We received the plan on February 23, 2000. We refer to this plan in this document as the MAG plan, the revised MAG plan, the MAG serious area plan, or variations of these; however, we also use these terms to refer to the set of documents that collectively comprise Arizona's complete serious area PM-10 plan for Maricopa County.

The second document is the *Maricopa County PM-10 Serious Area State Implementation Plan Revision, Agricultural Best Management Practices (BMP)*, June 2001, submitted in draft on April 26, 2001 and final on June 13, 2001. This SIP revision contains revisions to the 24-hour standard attainment and reasonable further progress demonstrations as well as to the contingency measure provisions in the MAG plan. ADEQ submitted this SIP revision on June 13, 2001. When necessary to refer specifically to this submittal in this document, we will refer to it as the BMP TSD; however, we consider it a revision to the MAG plan and not a stand-alone plan.

The third document is the December 11, 1997 submittal of *Serious Area Committed Particulate Control Measures for PM-10 for the Maricopa County Nonattainment Area and Support Technical Analysis*, MAG, December 1997. This submittal contains control measures that are also relied on in the MAG plan.

As submitted, the revised MAG plan consists of the main plan document, four volumes of technical appendices, and four volumes of commitments from various agencies to implement PM-10 controls. The plan contains a 1994 inventory and uses the urban airshed model/limited chemistry version (UAM/LC) to model regional air quality in 1995 as a base year and in 2006 as the attainment year, but relies on air quality modeling performed in the Microscale plan to evaluate 24-hour exceedances.

The MAG plan, as revised by the 2001 BMP TSD includes a BACM analysis and a demonstration that attainment by 2001 is impracticable for both the 24-hour and annual PM-10 standards. It also includes, again for both PM-10 standards, the State's request for a five year extension of the attainment date, a demonstration that the plan provides for the most stringent measures, and a demonstration of attainment by December 31, 2006.

The technical analysis in the plan shows that the principal sources contributing to both 24-hour and annual PM-10 exceedances are fugitive dust sources, such as construction sites, vacant lots, paved and unpaved roads, agricultural sources, and similar sources. The principal controls relied on for attainment of both standards are controls on these fugitive dust sources.

The BMP TSD includes a background document which provides the BACM demonstration for agricultural sources for both standards, a revised demonstration of attainment and RFP for the 24-hour standard as well as revisions to the contingency measure provisions for

both standards. It also includes documentation quantifying emission reductions from the BMPs and documentation related to implementing the BMPs.

The *Serious Area Committed Particulate Control Measures* submittal contains five volumes of commitments from the Maricopa area jurisdictions to a number of PM-10 control measures. Many of these commitments are duplicated in the revised 1999 MAG plan.

How the MAG Plan Relates to other PM-10 Plans for the Maricopa Area

The MAG plan is the latest in a series of PM-10 plans that have been developed for the Phoenix area. Below, we provide a time line of the most important events related to PM-10 planning in the area in order to illustrate the relationship between these earlier plans and the revised MAG serious area plan.

July 1, 1987	EPA sets the annual and 24-hour PM-10 standards (52 FR 24672).
August 7, 1987	The Phoenix area, with its strong likelihood of violating the new PM-10 standards, is designated a Group I PM-10 area (52 FR 29384).
November 15, 1990	The Phoenix area is designated as nonattainment and classified as moderate for PM-10. CAA section 107(d)(4)(B)(i) and 188(a). 56 FR 11101 (March 15, 1991).
November 15, 1991	Arizona submits the MODERATE AREA PM-10 PLAN for the Phoenix area on the date required by the Clean Air Act.
March 4, 1992	We find the MODERATE AREA PM-10 PLAN incomplete because it was not appropriately subject to public hearing and because the State does not have sufficient authority to enforce the plan. This finding starts the 18-month sanctions clock and 24-month clock to issue a MODERATE AREA PM-10 FEDERAL IMPLEMENTATION PLAN (FIP) .
August 11, 1993	Arizona submits the first revision to the MODERATE AREA PM-10 PLAN .
September 7, 1993	We find the revised MODERATE AREA PM-10 PLAN complete, stopping the sanction clocks; however, the MODERATE AREA PM-10 FIP clock continues.

March 3, 1994	Arizona submits the second revision to the MODERATE AREA PM-10 PLAN .
June 28, 1994	ACLPI sues to enforce the FIP obligation which became ripe on March 4, 1994. We settle this case with an agreement to act on the MODERATE AREA PM-10 PLAN by March 1, 1995. <i>Ober v. Browner</i> , No. CIV 94-1318 PHX, PGR, Consent Decree, March 6, 1995.
July 28, 1994.	We propose to approve the MODERATE AREA PM-10 PLAN . 59 FR 38402.
December 31, 1994	Attainment date for moderate nonattainment PM-10 areas like Phoenix to attain. However, on this date the Phoenix area is still violating both the annual and 24-hour PM-10 standards.
April 10, 1995	We approve the MODERATE AREA PM-10 PLAN . 60 FR 18010. Shortly afterwards, ACLPI petitions the 9th Circuit to review our approval.
May 10, 1996	We find the Phoenix area failed to attain the PM-10 standards by the moderate area attainment date. The area is reclassified to serious, effective June 10, 1996. 61 FR 21372. The SERIOUS AREA PM-10 PLAN is due December 10, 1997.
May 14, 1996	The 9th Circuit vacates our approval of the MODERATE AREA PM-10 PLAN finding that the plan did not address the 24-hour PM-10 standard and that we had failed to provide the required opportunity for comment during our rulemaking process on the RFP and RACM demonstrations for the annual standard. The Court orders us to require the State to address the moderate area requirements for the 24-hour standard and to provide the needed opportunity to comment. <i>Ober v. EPA</i> , 84 F.3d 304 (9th Cir. 1996).
September 18, 1996	To comply with the court's order, we send a letter to the State requiring the submittal by May 9, 1997, of a plan, the MICROSCALE PLAN , addressing the serious area requirements for the 24-hour PM-10 standard at five monitors. Since the area has been reclassified to serious, we determine that the most efficient use of resources is to require the State to address the serious area plan requirements on an expedited schedule instead of requiring them to go back and address the moderate area requirements.

October 26, 1996	To comply with the court's order for additional opportunity for public comment, we repropose approval of the MODERATE AREA PM-10 PLAN as it relates to the annual standard. 61 FR 54972
November 29, 1996	We settle again with ACLPI regarding our FIP obligation. This time we agree to act on the MICROSCALE PLAN by July 18, 1997 and, if we disapprove the plan, promulgate a MODERATE AREA PM-10 FIP by July 18, 1998. <i>Ober v. Browner</i> , No. CIV 94-1318 PHX, PGR, Consent Decree, November 29, 1996.
May 9, 1997	Arizona submits the MICROSCALE PLAN which evaluates 24-hour exceedances at four monitors. The plan finds that 24-hour exceedances are principally caused by fugitive dust from construction, agriculture, unpaved roads and parking lots, and disturbed vacant land.
August 4, 1997	We approve in part and disapprove in part the MICROSCALE PLAN . The disapprovals are because the plan did not provide BACM for agricultural sources, unpaved roads, unpaved parking lots, and disturbed vacant lots. The partial disapprovals mean we will have to issue a MODERATE AREA PM-10 FIP . 62 FR 41856.
December 10, 1997	The SERIOUS AREA PM-10 PLAN is due. Arizona submits measures but no other elements of the serious area plan.
February 6, 1998	We find the State has failed to submit the SERIOUS AREA PLAN , starting new sanction clocks and a SERIOUS AREA PM-10 FIP clock. 63 FR 9423 (February 25, 1998)
August 3, 1998	We issue the MODERATE AREA PM-10 FIP which includes a federal fugitive dust rule addressing unpaved roads, unpaved parking lots, and disturbed vacant lots and a commitment to develop agricultural controls. At the same time, we disapprove the annual standard attainment and RACM demonstrations in the MODERATE AREA PM-10 PLAN . The disapprovals start another set of sanction clocks, the first of which was set to expire on March 2, 2000 and second on September 2, 2000. 63 FR 41326.

June 29, 1999	We replace the commitment to develop agricultural controls in MODERATE AREA PM-10 FIP with a State commitment to adopt best management practices for the agricultural sources. 64 FR 34726
July 8, 1999	State submits the SERIOUS AREA PM-10 PLAN addressing both the 24-hour and annual PM-10 standards on a regional basis.
August 4, 1999	We find the SERIOUS AREA PM-10 PLAN complete. The finding stops the sanction clocks running because of the February 6, 1998 failure to submit finding but does not stop sanction clocks running because of the August 3, 1998 disapprovals.
November 9, 1999	We notify the state that additional work needs to be done on the SERIOUS AREA PM-10 PLAN in order for us to approve it and for the Phoenix area to avoid sanctions.
February 23, 2000	We receive the revised SERIOUS AREA PM-10 PLAN .
March 2, 2000	The Clean Air Act 2:1 offset sanction goes into place. The sanction is the result of the August 3, 1998 disapprovals of the attainment and RACM demonstrations in the MODERATE AREA PM-10 PLAN .
April 13, 2000	We propose to approve the revised SERIOUS AREA PM-10 PLAN'S provisions for attaining the annual standard. 66 FR 19964 We also issue an interim final determination that Arizona has corrected the deficiencies that resulted in sanctions. This interim final determination stays the sanctions. 66 FR 19992
July 11, 2000	Arizona submits the AGRICULTURAL BEST MANAGEMENT PRACTICES RULE .
March 23, 2001	The 9th Circuit upholds our use in the MODERATE AREA PM-10 PLAN of a de minimis source category exemption from the RACM requirement. <i>Ober v. Whitman</i> , 243 F.3d 1190 (9th Cir. 2001)
April 26, 2001	Arizona submits in draft form the information quantifying the impact of the agricultural best management practices general permit rule, a revised demonstration of attainment for the 24-hour standard; and revisions to the contingency measure provisions in the MAG plan.

June 13, 2001	Arizona submits in final form the information quantifying the impact of the agricultural best management practices general permit rule, a revised demonstration of attainment for the 24-hour standard; and revisions to the contingency measures in the MAG plan.
June 29, 2001	We propose to approve the agricultural best management practices general permit rule and to find the rule is RACM for agricultural sources. 66 FR 34598
September 10, 2001	We sign the approval of the agricultural best management practices general permit rule and to find the rule is RACM for agricultural sources.

Relationship of the 1997 Microscale Plan to the 2000 MAG Plan and BMP SIP

Most of the technical evaluation that underlies the 24-hour standard provisions in the MAG plan is contained in the *Plan for Attainment of the 24-hour PM-10 Standard - Maricopa County PM-10 Nonattainment Area*, ADEQ, May, 1997. This plan, known as the Microscale plan, was submitted to us in May 1997. It addresses exceedances of the 24-hour PM-10 standard at four Phoenix area monitoring sites: Salt River, Maryvale, Gilbert, and West Chandler.

The Microscale plan was developed in response to an order of the Ninth Circuit Court of Appeals in *Ober v. EPA*, 84 F.3d 304 (9th Cir. 1996) (*Ober I*). In *Ober I*, the court found that Arizona was required to address the CAA's moderate area requirements for RFP, RACM and attainment or impracticability for both the 24-hour and the annual PM-10 standards in its moderate area plan but had failed to do so for the 24-hour standard. To remedy this failure, the court required EPA to require Arizona to submit separate moderate area RACM, RFP, and attainment demonstrations for the 24-hour standard. 84 F.3d at 311.

To respond to the court's order, we, in consultation with Arizona, decided that the State would incorporate the moderate area plan elements for the 24-hour standard into the serious area plan it was then in the process of developing, but would split that planning effort into two related parts: a limited, locally-targeted plan (the Microscale plan) meeting both the moderate and serious area requirements for the 24-hour standard to be submitted by May 9, 1997 and a full regional plan meeting those requirements for both the 24-hour and annual standards to be submitted by December 10, 1997. Thus, the microscale and regional plans taken together would satisfy both the moderate area requirements for the 24-hour standard and the serious area planning requirements for both standards. See letter, Felicia Marcus, Regional Administrator, EPA Region IX, to Russell Rhoades, Director, ADEQ, September 18, 1996.

ADEQ submitted the Microscale plan in May, 1997. The plan contained a complete evaluation of the 1995 exceedances of the 24-hour standard at the four sites. This evaluation

included development of local, day-specific inventories and dispersion modeling to evaluate source contribution to each exceedance at each site. This evaluation showed that the primary contributors to 24-hour exceedances in the Phoenix area are local fugitive dust sources such as construction sites, agricultural fields, vacant lots, unpaved roads and parking lots, and earthmoving operations. The Microscale plan also described the type of controls necessary to show attainment at each site although the plan only assured the implementation of such controls on construction-related sources.

We approved the Microscale plan in part and disapproved the plan in part on August 4, 1997 (62 FR 41856). We approved the attainment and reasonable further progress (RFP) demonstrations for the Salt River and Maryvale sites because the plan demonstrated expeditious attainment at these sites; however, we disapproved these demonstrations for the West Chandler and Gilbert sites because the plan did not demonstrate attainment at them. Because there are already approved demonstrations at the Salt River and Maryvale sites, ADEQ has focused its subsequent microscale work on developing approvable demonstrations for the Gilbert and West Chandler sites.

To evaluate the provisions for the 24-hour PM-10 standard in the MAG plan, we are relying to a large extent on our previous evaluation of the Microscale plan. Except for our findings related to the implementation of BACM, we are not reevaluating those 24-hour provisions that we have already found adequate or have approved as part of our actions on the Microscale plan.

Who to Contact for More Information

FOR MORE INFORMATION ON...	PLEASE CONTACT...	AT
Clean Air Act and EPA requirements for serious area PM-10 plans	Frances Wicher	(415) 744-1248 wicher.frances@epa.gov
PM-10 planning in the Maricopa nonattainment area	Frances Wicher	(415) 744-1248 wicher.frances@epa.gov
Maricopa serious area PM-10 plan	Frances Wicher	(415) 744-1248 wicher.frances@epa.gov
Completeness determination	Frances Wicher	(415) 744-1248 wicher.frances@epa.gov
The docket #AZ-MA-99-001	Frances Wicher	(415) 744-1248 wicher.frances@epa.gov

**FOR MORE
INFORMATION ON...**

PM-10 FIP

MCESD fugitive dust
rules

PLEASE CONTACT...

Colleen McKaughan

Karen Irwin

AT

(520) 498-0118
mckaughan.colleen@epa.gov

(415) 744-1903
irwin.karen@epa.gov

Section 2 – The Completeness Determination

Completeness Determinations

The first step we take after receiving a SIP submittal is to determine if it is complete. CAA section 110(k)(1)(B) requires that we review all SIPs and SIP revisions for completeness within 60 days of receipt. The completeness review allows us to quickly determine if the submittal includes all the necessary items and information we need to take action on it.

We make completeness determinations using criteria we have established in 40 CFR part 51, Appendix V. These criteria fall into two categories: administrative information and technical support information. The administrative information provides documentation that the State has followed basic administrative procedures during the SIP-adoption process and thus we have a legally-adopted SIP revision in front of us. The technical support information provides us the information we need to determine the impact of the proposed revision on attainment and maintenance of the air quality standards.

We notify a state of our completeness determination by letter. A finding of completeness does not approve the submittal as part of the SIP nor does it indicate that the submittal is approvable. It does start the 12 month clock we have to act on the SIP submittal. See CAA section 110(k)(2).

Completeness Determinations on the Revised MAG Plan

We found ADEQ's February 16, 2000 submittal (received on February 23, 2000) of the final revised MAG serious area PM-10 plan complete. We notified the State of our completeness determination on February 25, 2000. See Letter, David P. Howekamp, EPA, to Jacqueline Schafer, ADEQ.

We have also found ADEQ's June 13 2001 submittal of the BMP plan complete. We notified the State of our completeness determination on August 10, 2001. See letter, Jack Broadbent, EPA to Jacqueline Schafer, ADEQ.

We document in Table 2-1 and Table 2-2 our findings that the revised MAG plan and BMP plan, respectively, meet each of the completeness criteria in our regulations at 40 CFR part 51, appendix V. We have also determined the plan includes all the elements required by the Clean Air Act for a serious area PM-10 plan. See Table 2-3. Our completeness determinations cover the plan's provisions for both the annual and 24-hour standards, although we are only proposing to act on the 24-hour standard provisions here.

We did not make a completeness finding on the December 10, 1997 submittal of the *Serious Area Committed Particulate Control Measures for PM-10 for the Maricopa County*

Nonattainment Area and Support Technical Analysis, MAG, December 1997. Under CAA section 110(k)(6)(B), the submittal became complete by operation of law, on June 15, 1998, six months after we received it on December 15, 1997.

We also did not make a completeness finding on the April 26, 2001 submittal of the draft BMP plan because it was superceded by the June 13, 2001 submittal of the final plan. We have, however, documented its completeness below in Table 2-2.

TABLE 2-1 COMPLETENESS DETERMINATION FOR THE FEBRUARY 16, 2000 SUBMITTAL OF THE REVISED MAG SERIOUS AREA PM-10 PLAN		
THIS COMPLETENESS CRITERION...	IS...	BY THE SUBMITTAL IN...
Administrative Requirements		
Letter submitting the plan from the Governor's designee	met	The cover letter for the submittal (Letter, Jacqueline E. Schafer (Director, ADEQ) to Felicia Marcus (Regional Administrator, USEPA - Region 9), February 16, 2000 "Submittal of the Revised Maricopa Association of Governments 1999 Serious Area Particulate Plan for the Maricopa County Nonattainment Area (February 2000)."
Evidence that the State adopted the plan (including adoption and effective dates)	met	The cover letter. Both adoption and effective dates are February 16, 2000.
Evidence that the State has the legal authority to adopt and implement the plan	met	For both ADEQ and MAG: A.R.S. §49-404 and §49-406(H) (Copies of these sections of the A.R.S., including 1999 revisions are enclosure 1 of the submittal.) For local jurisdictions: A.R.S. §9-239, §11-251, & §406(G) (Copies of the first two sections can be found in the attachment to the MAG resolution of adoption found in the Commitments for Implementation, Volume One, copy of the last A.R.S. section is in enclosure 1 of the submittal.)
A copy of the plan with certification	met	<i>Revised Maricopa Association of Governments 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area</i> , February 2000. (enclosure 3 of the submittal). Certification of adoption by MAG is found in Appendix D, Exhibit 2 of the plan. Certification of adoption by ADEQ is found in the cover letter.

TABLE 2-1 COMPLETENESS DETERMINATION FOR THE FEBRUARY 16, 2000 SUBMITTAL OF THE REVISED MAG SERIOUS AREA PM-10 PLAN		
THIS COMPLETENESS CRITERION...	IS...	BY THE SUBMITTAL IN...
Evidence that the State followed its applicable administrative procedures in adopting the plan	met for ADEQ	ADEQ is authorized to adopt the plan "in accordance with the rules adopted pursuant to §49-404." See §49-406(H). However, ADEQ was not required to adopt rules for adopting SIP revisions and did not. See §49-404. Therefore, no state APA rules exist for adoption of SIP revisions.
	met for MAG	Chapter 11 of the plan (note that MAG's process for developing and adopting the plan are MAG policies and not state regulations)
	met for local jurisdictions	Resolutions of adoption by the local jurisdictions of the Maricopa nonattainment area found in Chapter 12 of the plan.
Evidence of public notice	met	"Affidavit of Publication" <i>The Arizona Republic</i> , December 30, 1999 found in Appendix D, Exhibit 1 of the plan.
Evidence of public hearing	met	"Certification of Holding of Public Hearing," January 31, 2000 found in Appendix D, Exhibit 1 of the plan.
Public comments and the State's responses	met	Copies of public comments and a transcript of the two public hearings found in Appendix D, Exhibit 1 of the plan. "Response to the Public Comments on the Draft Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area," found in Appendix D, Exhibit 1 of the plan. "Response to the Public Comments on the Draft MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area," found in Appendix D, Exhibit 1 of the plan.
Technical Requirements		
Identification of pollutants affected by the plan	met	throughout the plan
Identification of the location of affected sources including area's designation and status of the attainment plan	met	Chapter 1 of the plan
Quantification of emissions from the affected sources from the plan	met	pp. 3-2 to 3-5, p. 8-4, and Appendix A, Exhibit 6 for regional emissions inventories Appendix C, Exhibit 3, Chapter 3 for the microscale inventories

TABLE 2-1 COMPLETENESS DETERMINATION FOR THE FEBRUARY 16, 2000 SUBMITTAL OF THE REVISED MAG SERIOUS AREA PM-10 PLAN		
THIS COMPLETENESS CRITERION...	IS...	BY THE SUBMITTAL IN...
Demonstration that the NAAQS and RFP are protected	met	pp. 8-11 to 8-14 and p. 8-20 of the plan
Modeling information required to support the proposed revision including supporting documentation	met	pp. 8-1 to 8-7, Appendix A, Exhibit 7, Appendix C, Exhibit 3.
Evidence, where necessary, that emission limitations, are based on continuous emission reduction technology	N/A	-----
Evidence that the plan contains emission limitations, work practice standards and record keeping/ reporting requirements, where necessary, to ensure emission levels	met	See Table 2-3 below.
Compliance/enforcement strategies including how compliance will be determined in practice	met	See Table 2-3 below.
Special economic and technological justifications required by applicable EPA policies, or an explanation of why such justifications are not necessary	met	BACM analysis: Chapter 9 of the plan Request for Attainment Date Extension: Chapter 10 of the plan
Plan addresses the elements required by the Act and EPA policy for serious area PM-10 plans	met	See Table 2-3 below.

<p align="center">TABLE 2-2</p> <p align="center">COMPLETENESS DETERMINATION FOR THE APRIL 26</p> <p align="center">AND JUNE 13, 2001 SUBMITTALS</p> <p align="center">OF THE AGRICULTURAL BEST MANAGEMENT PRACTICES</p>		
THIS COMPLETENESS CRITERION...	Is...	BY THE SUBMITTAL IN...
Administrative Requirements		
Letter submitting the plan from the Governor's designee	met	Final submittal: the cover letter for the submittal (Letter, Jacqueline E. Schafer (Director, ADEQ) to Laura Yoshii (Acting Regional Administrator, USEPA - Region 9), June 13, 2001 <u>Submittal of State Implementation Plan revision for the Agricultural Best Management Practices Program in the Maricopa County PM-10 Nonattainment Area</u> (June 13, 2001). Draft submittal: the cover letter for the submittal (Letter, Jacqueline E. Schafer (Director, ADEQ) to Laura Yoshii (Acting Regional Administrator, USEPA - Region 9), April 26, 2001 <u>Submittal of Proposed State Implementation Plan revision for the Agricultural Best Management Practices Program in the Maricopa County PM-10 Nonattainment Area</u> (April 26, 2001).
Evidence that the State adopted the plan (including adoption and effective dates)	met	The June 13, 2001 cover letter. Both adoption and effective dates are June 13, 2001. For BMP rule, Arizona Administrative Register, volume 6, Issue 23, p. 2009 (June 2, 2000) found in Enclosure 3, Attachment 3. N/A for draft.
Evidence that the State has the legal authority to adopt and implement the plan	met	A.R.S. §49-404 and §49-406(H) (Copies of these sections of the A.R.S., including 1999 revisions are enclosure 2 of the final submittal.)
A copy of the plan with certification	met	Final submittal: <i>Maricopa County PM-10 Serious Area State Implementation Plan Revision, Agricultural Best Management Practices</i> , June 13, 2001, found in enclosure 3 of the submittal. Certification of adoption by ADEQ is found in the cover letter. Draft SIP: <i>Draft Maricopa County PM-10 Serious Area State Implementation Plan Revision, Agricultural Best Management Practices</i> , April 2001 found in enclosure 3 of the submittal.
Evidence that the State followed its applicable administrative procedures in adopting the plan	met	ADEQ is authorized to adopt the plan "in accordance with the rules adopted pursuant to §49-404." See §49-406(H). However, ADEQ was not required to adopt rules for adopting SIP revisions and did not. See §49-404. Therefore, no state APA rules exist for adoption of SIP revisions.

TABLE 2-2 COMPLETENESS DETERMINATION FOR THE APRIL 26 AND JUNE 13, 2001 SUBMITTALS OF THE AGRICULTURAL BEST MANAGEMENT PRACTICES		
THIS COMPLETENESS CRITERION...	Is...	BY THE SUBMITTAL IN...
Evidence of public notice	met	“Affidavit of Publication” <i>The Arizona Republic</i> , April 30, 2001; “Affidavit of Publication” <i>The Tribune</i> , April 27, 2001; “Affidavit of Publication” <i>Arizona Capitol Times</i> , April 27, 2001. N/A for draft.
Evidence of public hearing	met	“Public Hearing Presiding Officer Certification,” June 8, 2001 found in Enclosure 4, Attachment 5. N/A for draft.
Public comments and the State’s responses	met	A transcript of the public hearing is found in Enclosure 4, Attachment 4. No comments were received. N/A for draft.
Technical Requirements		
Identification of pollutants affected by the plan	met	throughout the plan
Identification of the location of affected sources including area’s designation and status of the attainment plan	met	“Final Revised Background Information,” June 13, 2001 found in Enclosure 3 of the June 13, 2001 submittal.
Quantification of emissions from the affected sources from the plan	met	“Technical Support Document for Quantification of Agricultural Best Management Practices,” URS and ERG, June 8, 2001 found in Enclosure 3, Attachment 5.
Demonstration that the NAAQS and RFP are protected	met	“Final Revised Background Information,” June 13, 2001, pp. 6-8.
Modeling information required to support the proposed revision including supporting documentation	met	“Final Revised Background Information,” June 13, 2001, pp. 6-8.
Evidence, where necessary, that emission limitations, are based on continuous emission reduction technology	N/A	-----
Evidence that the plan contains emission limitations, work practice standards and record keeping/ reporting requirements, where necessary, to ensure emission levels	met	A.R.S. R18-2-611 I.

TABLE 2-2 COMPLETENESS DETERMINATION FOR THE APRIL 26 AND JUNE 13, 2001 SUBMITTALS OF THE AGRICULTURAL BEST MANAGEMENT PRACTICES		
THIS COMPLETENESS CRITERION...	IS...	BY THE SUBMITTAL IN...
Compliance/enforcement strategies including how compliance will be determined in practice	met	"Final Revised Background Information," June 13, 2001, pp. 33-34.
Special economic and technological justifications required by applicable EPA policies, or an explanation of why such justifications are not necessary	met	BACM/MSM analysis: "Final Revised Background Information," June 13, 2001, pp. 9-27.
Plan addresses the elements required by the Act and EPA policy for serious area PM-10 plans	met	See Table 2-3 below.

TABLE 2-3 SERIOUS AREA REQUIREMENTS IN THE REVISED MAG SERIOUS AREA PM-10 PLAN AND BMP PLAN		
THIS SERIOUS AREA PLAN REQUIREMENT...	IS...	IN THE PLAN AT THIS LOCATION...
Emissions inventory		
Base year emissions inventory		
- 24 hour standard	included	MAG plan, Appendix C, Exhibit 3, Chapter 3, Microscale plan, Appendix A, Chapters 4 & 6.
- annual standard	included	MAG plan, pp. 3-2 thru 3-5 and Appendix A, Exhibit 6
Modeling inventory		
- 24 hour standard	included	MAG plan, Appendix C, Exhibit 3, Chapter 3, Microscale plan, Appendix A, Chapters 4 & 6.
- annual standard	included	MAG plan, Appendix A, Exhibit 7, Chapter II
Projected year inventories		

TABLE 2-3 SERIOUS AREA REQUIREMENTS IN THE REVISED MAG SERIOUS AREA PM-10 PLAN AND BMP PLAN		
THIS SERIOUS AREA PLAN REQUIREMENT...	Is...	IN THE PLAN AT THIS LOCATION...
- 24 hour standard	included	MAG plan, Appendix C, Exhibit 3, page 3-2, "Final Revised Background Information," pp. 30-31 and "Technical Support Document for Quantification of Agricultural Best Management Practices," URS and ERG, June 8, 2001.
- annual standard	included	MAG plan, Appendix A, Exhibit 7, Chapters II and V
Air Quality Monitoring		
Air Quality Data	included	MAG plan, pp. 3-6 thru 3-15 and Appendix A, Exhibit 8, Microscale plan, Appendix A, Chapter 3.
Air Monitoring Network	included	MAG plan, pp. 3-6 & 3-7, Microscale plan, Appendix A, Chapters 2 & 3.
RACM/BACM Analysis		
RACM/BACM analysis		
- 24 hour standard	included	MAG plan, Chapter 9, "Final Revised Background Information," pp. 9-27, Microscale plan, Chapter 4.
- annual standard	included	MAG plan, Chapter 9, "Final Revised Background Information," pp. 9-27.
BACM criteria		
- 24 hour standard	included	Criteria given throughout MAG plan, Chapter 9
- annual standard	included	Criteria given throughout MAG plan, Chapter 9
Available measures	included	MAG plan, pp. 5-5 thru 5-89 and Appendix B, Exhibits 5, 6 and 8, "Final Revised Background Information," pp. 10-17, Microscale plan, Chapter 4 and Appendix B.
Selected measures	included	MAG plan, Chapter 6, "Final Revised Background Information," p. 17, Microscale plan, Chapter 5.
Adopted measures	included	MAG plan, Chapter 7, "Final Revised Background Information," p. 17, Microscale plan, Chapter 5.
Justifications for rejecting measures	included	MAG plan, Chapter 9 and individual commitments by local jurisdictions in Chapter 12, "Final Revised Background Information," pp.18 - 26.
Attainment Demonstration		
Base year modeling		

TABLE 2-3 SERIOUS AREA REQUIREMENTS IN THE REVISED MAG SERIOUS AREA PM-10 PLAN AND BMP PLAN		
THIS SERIOUS AREA PLAN REQUIREMENT...	Is...	IN THE PLAN AT THIS LOCATION...
- 24 hour standard	included	MAG plan, p. 8-5 and Appendix C, Exhibit 3, pp. 3-7 to 3-9, "Final Revised Background Information," p. 17, Microscale plan, Chapter 6.
- annual standard	included	MAG plan, pp. 8-1 to 8-5, Appendix A, Exhibit 7, Chapter III
Future year modeling		
- 24 hour standard	included	MAG plan, p. 8-12 and Appendix C, Exhibit 3, pp. 3-7 to 3-9, "Final Revised Background Information," pp. 6-8, Microscale plan, Appendix A, Chapters 4 & 6.
- annual standard	included	MAG plan, pp. 8-5 to 8-7, pp 8-11 to 8-13, Appendix A, Exhibit 7, Chapter III
Attainment measures		
- 24 hour standard	included	MAG plan, Appendix C, Exhibit 3, p. 3-9, "Final Revised Background Information," pp 6-8, Microscale plan, Chapters 5 & 6..
- annual standard	included	MAG plan, pp. 8-7 to 8-9, Appendix A, Exhibit 7, Chapter V
Estimation of reductions from attainment measures		
- 24 hour standard	included	MAG plan, Appendix C, Exhibit 3, p. 3-9, "Final Revised Background Information," p. 6-8, Microscale plan, chapter 6.
- annual standard	included	MAG plan, pp. 8-7 to 8-9, Appendix A, Exhibit 7, Chapter V
Impracticability demonstration		
- 24 hour standard	included	MAG plan, pp. 10-3 to 10-5 and Appendix C, Exhibit 3, p. 3-8.
- annual standard	included	MAG plan, pp 8-10 to 8-11, pp. 10-7 to 10-8
Milestone Demonstration/RFP		
Milestone demonstration/RFP		
- 24 hour standard	included	"Final Revised Background Information," pp. 30-31, Microscale plan, Chapter 6.
- annual standard	included	MAG plan, pp. 8-19.

TABLE 2-3 SERIOUS AREA REQUIREMENTS IN THE REVISED MAG SERIOUS AREA PM-10 PLAN AND BMP PLAN		
THIS SERIOUS AREA PLAN REQUIREMENT...	Is...	IN THE PLAN AT THIS LOCATION...
Attainment Date Extension Request (24 hr and Annual Standard)		
Request	included	MAG plan, p. 10-2.
Implement SIP	included	MAG plan, p. 10-10 to 10-24.
Most expeditious attainment date		
- 24 hour standard	included	MAG plan, pp. 8-18, Appendix C, Exhibit 4.
- annual standard	included	MAG plan, pp. 8-18.
Most stringent measures analysis	included	MAG plan, pp. 10-25 to 10-47, Appendix C, Exhibit 4 "Final Revised Background Information," pp. 9-27.
Nature and extent of PM-10 problem	included	MAG plan, pp. 10-47 to 10-54
Population exposure	included	MAG plan, pp. 10-54 to 10-60
Toxic exposure	included	MAG plan, pp. 10-60 to 10-64
Economic and technological feasibility of measures	included	MAG plan, pp. 10-61 to 10-64, pp. 5-1 thru 5-4, Appendix C, Exhibit 4
Other Requirements		
Contingency measures	included	MAG plan, pp. 8-16 to 8-18, "Final Revised Background Information," pp. 27-31.
Conformity budget	included	MAG plan, pp. 8-13 to 8-16

Section 3 – CAA & EPA Policy Requirements for Serious Area PM-10 Plans

In this section, we discuss the legal basis for separately proposing action on the MAG plan's compliance with the CAA requirements for the annual and for the 24-hour PM-10 standards. We also provide an overview of the Clean Air Act requirements for serious area PM-10 plans. Next, we discuss in more detail the Act's requirement for best available control measures (BACM) in section 189(b)(1)(B). Finally, we present our preliminary interpretation of the attainment date extension provisions in CAA section 188(e).

We first presented our preliminary interpretation of the attainment date extension provision in our proposed approval of the annual standard provisions. See 66 FR 19992, 19967. Based on comments we received on it during the comment period for that proposal, we have clarified certain aspects of the policy but have made no substantive changes to it. We will fully respond to all comments received on the annual standard proposal as well as this proposal in the final action.

Since our annual standard proposal, the Ninth Circuit handed down its decision in *Ober v. Whitman* 243 F.3d 1190 (9th Cir. 2001) (*Ober II*). *Ober II* was a challenge to our exempting de minimis source categories from the reasonably available control measures requirement in our 1998 PM-10 moderate area federal implementation plan (FIP) for the Phoenix area. The court upheld our authority to do so and our specific application of the de minimis principle in the 1998 FIP. We discuss below the effect of the *Ober II* decision on our interpretation of the CAA's requirement for BACM and most stringent measures.

Separating Our Rulemakings on the Annual and 24-hour Standards

There are two PM-10 national ambient air quality standards (NAAQS), an annual standard of 50 $\mu\text{g}/\text{m}^3$ and a 24-hour standard of 150 $\mu\text{g}/\text{m}^3$. In this proposed action, we are evaluating the MAG plan only for its compliance with the Clean Air Act's requirements for attaining the 24-hour PM-10 standard.¹ We have previously evaluated the plan for its compliance with the Act's requirements for the annual PM-10 standard and proposed to approve those provisions. 66 FR 19992 (April 13, 2000).

The two PM-10 standards are independent and must be addressed independently by states in their SIPs. This independence was highlighted by the Ninth Circuit in *Ober v. EPA*, 84 F.3d 304 (9th Cir. 1996) (*Ober I*). *Ober I* involved a challenge to our approval of the 1991/93 moderate area PM-10 plan for the Phoenix metropolitan area. Arizona submitted the plan to address the moderate area planning requirements for both the annual and 24-hour PM-10

¹ We are, however, proposing to approve contingency measure provisions for both the annual and 24-hour standards.

standards. We reviewed the plan and approved it as fully meeting the requirements of the Act for PM-10 moderate nonattainment areas; that is, we approved it because we determined that it adequately addressed the planning requirements for both standards because it showed the impracticability of attaining the annual standard.²

Ober challenged the approval on several grounds, one of which was the plan's failure to address the CAA planning requirements separately for each PM-10 standard. *Ober I* at 308. The court held that the Act requires an implementation plan to address each of PM-10 standards independently:

The general provisions of the Clean Air Act repeatedly emphasize that implementation plans must provide for attainment of the NAAQS as expeditiously as practicable. For PM-10, the EPA promulgated two separate NAAQS—the annual standard and the 24-hour standard—which differ in the following respects. First, the 24-hour standard offers protection against dangerous short-term exposures to high PM-10 levels, a protection that is distinct from the protection against chronic degradation in lung function provided by the annual standard. Second, the sources of PM-10 violations differ for the annual and the 24-hour: violations of the 24-hour standard are generally caused by localized sources such as construction projects, whereas violations of the annual standard tend to be caused by more diverse, dispersed sources. Third, control measures differ in effectiveness for the 24-hour standard and the annual standard.

These differences emphasize the importance of viewing PM-10's two NAAQS individually and of requiring independent treatment of them in an implementation plan....Such independent treatment furthers the Clean Air Act's goals of protecting health and achieve clean air.

Ober I at 309 (emphasis added).

In reviewing the specifics of Arizona's moderate area plan and our actions on that plan, the court determined that Arizona's moderate PM-10 plan failed to treat the standards independently and thus we erred in approving the plan as sufficient to meet the Act's requirements for moderate PM-10 areas. *Ober I* at 311 and 309. In making these determinations,

² We argued that because the 1991/93 plan conclusively demonstrated the impracticability of attainment of the annual standard in the Phoenix area by the moderate area attainment date, the area would be reclassified to serious and therefore a separate demonstration for the 24-hour standard was unnecessary: "EPA disagrees that the impracticability of meeting both standards must be demonstrated....if the SIP demonstrates that even with the implementation of RACM it cannot attain any one of the standards (annual or 24-hour) by December 31, 1994, then it has demonstrated that PM-10 attainment is impracticable." See 60 FR 18010, 18016.

the court was objecting, not to our failure to act on both standards together, but to our effectively waiving Arizona's duty to meet the moderate area requirements for the 24-hour standard based on the demonstration that it was impracticable to attain the annual standard. As a remedy, the court remanded the approval to us and ordered us to require Arizona to submit separate demonstrations of the implementation of all RACM, attainment, and reasonable further progress for the 24-hour standard. *Ober I* at 316.

If the CAA requires states treat each PM-10 standard independently in their implementation plans, then we also must treat each PM-10 standard independently when reviewing the plans' compliance with the Clean Air Act. Therefore, it is necessary for us to review the MAG plan's compliance with the CAA requirements as they apply to the annual standard and again review them with the CAA requirements as they apply to the 24-hour standard. There is no mandate in the Act or *Ober I* nor any technical reason that we conduct these reviews concurrently, even if Arizona had submitted a single document containing SIP revisions for both standards since, effectively, we must treat it as if it contained two separate plans.³

We chose not to propose action on the 24-hour standard provisions of the revised MAG plan concurrently with our April 2000 proposed actions on the annual standard provisions because the State was then still working on quantifying emission reductions from the best management practices (BMPs) intended to reduce fugitive dust from agricultural sources. Attainment of the 24-hour standard in the Phoenix area, unlike the annual standard, depends in part on emission reductions from these BMPs. Once Arizona quantified the reductions from the BMPs, it revised the 24-hour attainment and reasonable further progress demonstrations and resubmitted them to us in final form in June 2001. We do not believe it would have been an efficient use of our resources to act on the 24-hour provisions until Arizona submitted the revisions.

Planning Requirements for Serious PM-10 Nonattainment Areas

States with PM-10 nonattainment areas that have been reclassified to serious because of a failure to attain by the moderate area attainment date must submit within 18 months of the reclassification (as set in section 189(b)(2)), revisions to its implementation plan that address each of the following CAA requirements:

³ Arizona has, in fact, submitted four distinct documents to address the serious area planning requirements for the 24-hour and annual standards. These documents are the 1997 Microscale plan, the 1997 control measure submittal, the 2000 revised MAG plan, and the 2001 BMP TSD. It has also made several other submittals containing the rules relied on in the plan. We have already acted on the Microscale plan, a plan that addressed only the 24-hour standard.

- (a) provisions to assure that the best available control measures (BACM), including best available control technology (BACT) for stationary sources, for the control of PM-10 shall be implemented no later than 4 years after the area is reclassified (CAA section 189(b)(1)(B));⁴
- (b) provisions to assure implementation of best available control technology (BACT) on major stationary sources of PM-10 precursors no later than 4 years after the area is reclassified except where EPA has determined that such sources do not contribute significantly to exceedances of the PM-10 standards (CAA section 189(e));
- (c) a demonstration (including air quality modeling) that the plan will provide for attainment as expeditiously as practicable but no later than December 31, 2001 or where the State is seeking an extension of the attainment date under section 188(e), a demonstration that attainment by December 31, 2001 is impracticable and that the plan provides for attainment by the most expeditious alternative date practicable (CAA sections 188(c)(2) and 189(b)(1)(A));
- (d) quantitative milestones which are to be achieved every 3 years and which demonstrate reasonable further progress (RFP) toward attainment by the applicable attainment date (CAA sections 172(c)(2) and 189(c)); and
- (e) a comprehensive, accurate, current inventory of actual emissions from all sources of PM-10 (CAA section 172(c)(3)).

The 18 month deadline is set in CAA section 189(b)(2).

Within 3 years of reclassification, the State must also submit contingency measures as required by CAA section 172(c)(9). The Act does not specify a submittal date for these contingency measures, so we set it under our authority to set submittal dates in CAA 172(b). See 59 FR 41998, 42015 (August 16, 1994).

Serious area PM-10 plans must also meet the general requirements applicable to all SIPs including reasonable notice and public hearing under section 110(l), necessary assurances that the implementing agencies have adequate personnel, funding and authority under section 110(a)(2)(E)(i) and 40 CFR 51.280; and the description of enforcement methods as required by 40 CFR § 51.111.

⁴ When a moderate area is reclassified to serious, the requirement to implement RACM in section 189(a)(1)(C) remains and is augmented by the requirement to implement BACM. Thus, a serious area PM-10 plan must, in addition to BACM, provide for the implementation of RACM as expeditiously as practicable to the extent that the RACM requirement has not be satisfied in the area's moderate area plan.

We have issued a *General Preamble*⁵ and *Addendum to the General Preamble*⁶ describing our preliminary views on how the Agency intends to review SIPs submitted to meet the Clean Air Act's requirements for PM-10 plans. The *General Preamble* mainly addresses the requirements for moderate areas and the *Addendum*, the requirements for serious areas. We have also issued other guidance documents related to PM-10 plans or provisions of those plans. These other guidance documents will be cited as necessary when we discuss the details of the MAG plan.

Implementation of Best Available Control Measures

Under section 189(b)(2), serious area PM-10 plans must provide assurances that BACM will be implemented in the area no later than four years after the area is reclassified as serious. For Phoenix, the BACM implementation deadline was June 10, 2000.

The Act does not define what level of control constitutes a BACM-level of control. In guidance, we have defined it to be, among other things, the maximum degree of emission reduction achievable from a source or source category which is determined on a case-by-case basis, considering energy, economic and environmental impacts. *Addendum* at 42010. This level of control is dependent on the deadline by which BACM must be implemented.⁷

We also considered a BACM-level control as going beyond existing RACM-level controls, such as expanding use of RACM (e.g, paving more miles of unpaved roads). *Addendum* at 42013. Additionally, we believe that BACM should emphasize prevention rather than remediation (e.g., preventing track out at construction sites rather than simply requiring clean up of tracked-out dirt). *Addendum* at 42013.

⁵ "State Implementation Plans; General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990," 57 FR 13498 (April 16, 1992) and 57 FR 18070 (April 28, 1992).

⁶ "State Implementation Plans for Serious PM-10 Nonattainment Areas, and Attainment Date Waivers for PM-10 Nonattainment Areas Generally; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990," 59 FR 41998 (August 16, 1994)

⁷ We have long held that an otherwise available measure is not reasonable if it cannot be implemented on a schedule that will advance the attainment date. See, for example, 57 FR 13498, 15560 (April 16, 1992). See, also *Delaney v. EPA* 898 F.2d 695 (9th Cir. 1990) which required the adoption of "all available control measures" to attain "as soon as possible" and not simply all available control measures. The most clear example of this is a measure that cannot be implemented until after the applicable attainment date.

BACM is the best available *control measure*. A control measure is a combination of the measure's applicability and its control requirement, that is, what sources in the category are subject to the measure and what does the measure require the sources to do to reduce emissions.⁸ Both these elements must be specified before the measure's level of control (i.e., its stringency) can be determined, thus in setting a BACM, a state must specify both the measure's control requirement and its applicability. The control requirement alone is not sufficient.

BACM must be applied to each significant (i.e., non-de minimis) source category. *Addendum at 42011.* In guidance, we have established a presumption that a "significant" source category is one that contributes $5 \mu\text{g}/\text{m}^3$ or more of PM-10 to a location of 24-hour violation. *Addendum at 42011.* However, whether the threshold should be lower than this in any particular area depends upon the specific facts of that area's nonattainment problem. Specifically, in areas that are demonstrating attainment by December 31, 2001, it depends on whether requiring the application of BACM on source categories below a proposed de minimis level would meaningfully expedite attainment. In areas that are claiming the impracticability of attainment by December 31, 2001, it depends upon whether requiring the application of BACM on source categories below a proposed de minimis level would make the difference between attainment and nonattainment by the serious area deadline of December 31, 2001.⁹

The recent decision by the Ninth Circuit Court of Appeals in *Ober II* supports the use of a de minimis exemption in BACM analyses. *Ober II* was a challenge to our 1998 PM-10 moderate area FIP for the Phoenix area in which we exempted from the RACM requirement, source categories with de minimis impacts on PM-10 levels. In the FIP, we established a de minimis threshold of $1 \mu\text{g}/\text{m}^3$ for the annual standard and $5 \mu\text{g}/\text{m}^3$ for the 24-hour standard, borrowing these thresholds from our new source review program for attainment areas to as a starting point in the de minimis analysis. In evaluating the appropriateness of these thresholds, we showed that they did not eliminate controls that would make the difference between attainment and nonattainment by the applicable attainment deadline, and therefore were the appropriate thresholds. See 63 FR 41326, 41330 (August 3, 1998).

⁸ An example: a measure requires all unpaved roads with ADT over 150 be stabilized by either paving, graveling, or treating with chemical stabilizers. The control requirement here is "stabilize using one of these three methods: paving, graveling, or chemical stabilization" and the applicability is "all unpaved roads with ADT over 150."

⁹ This principle is best illustrated by an example: In Area A, attainment of the 24-hour standard by December 31, 2001 requires that PM-10 ambient levels at exceeding locations be reduced by $40 \mu\text{g}/\text{m}^3$ to $150 \mu\text{g}/\text{m}^3$. After application of BACM to all source categories above the proposed de minimis level, PM-10 levels are reduced by $32 \mu\text{g}/\text{m}^3$. BACM on the proposed de minimis source categories would reduce levels by a further $3 \mu\text{g}/\text{m}^3$, but still leaves ambient levels $5 \mu\text{g}/\text{m}^3$ short of the reduction needed to show attainment. Since application of BACM to the proposed de minimis source categories still leaves ambient levels above the attainment level of $150 \mu\text{g}/\text{m}^3$, the proposed de minimis level is appropriate.

In its ruling, the court held that we have the power to make de minimis exemptions to control requirements under the Clean Air Act and that our use of the de minimis levels from the NSR program was appropriate. *Ober II* at 1195 and 1197. In addition, the court determined that it was appropriate for us to use, as a criterion for identifying de minimis sources, whether controls on the sources would result in attainment by the attainment deadline. *Ober II* at 1198. *Ober II* dealt with a de minimis exemption from the RACM requirement, but its reasoning applies equally to the BACM requirement.

We have outlined in our guidance a multi-step process for identifying BACM. *Addendum* at 42010-42014. The steps are:

1. develop a detailed emissions inventory of PM-10 sources and source categories,
2. model to evaluate the impact on PM-10 concentrations over the standards of the various sources and source categories to determine which are significant,
3. identify potential BACM for significant source categories including their technological feasibility, costs, and energy and environmental impacts when it bears on the BACM determination, and
4. provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Implementation of Reasonably Available Control Measures

When a moderate area is reclassified to serious, the requirement to implement RACM in section 189(a)(1)(C) remains. Thus, a serious area PM-10 plan must also provide for the implementation of RACM as expeditiously as practicable to the extent that the RACM requirement has not been satisfied in the area's moderate area plan.

However, we do not normally conduct a separate evaluation to determine if a serious area plan's measures also meet the RACM requirements as interpreted by us in the *General Preamble* at 13540. This is because in our serious area guidance (*Addendum* at 42010), we interpret the BACM requirement, as generally subsuming the RACM requirement (i.e. if we determine that the measures are indeed the "best available," we have necessarily concluded that they are "reasonably available"). Therefore, a separate analysis to determine if the measures represent a RACM level of control is not necessary. Consequently, our proposed approval of the MAG plan's provisions relating to the implementation of BACM is also a proposed finding that the plan provides for the implementation of RACM.

Extension of the Attainment Date beyond 2001

The Clean Air Act Requirements for Attainment Date Extensions

Section 188(e) of the Act allows us to extend the attainment date for a serious area for up to five years beyond 2001 if attainment by 2001 is impracticable. However, before we may grant an extension of the attainment date, the State must first:

1. apply to us for an extension of the PM-10 attainment date beyond 2001,
2. demonstrate that attainment by 2001 is impracticable,
3. have complied with all requirements and commitments applying to the area in its implementation plan,
4. demonstrate to our satisfaction that its serious area plan includes the most stringent measures that are included in the implementation plan of any state and/or are achieved in practice in any state and are feasible for the area, and
5. submit a demonstration of attainment by the most expeditious alternative date practicable.

In determining whether to grant an extension and the appropriate length of the attainment date extension, we may consider:

1. the nature and extent of the nonattainment problem,
2. the types and numbers of sources or other emitting activities in the area (including the influence of uncontrollable natural sources and international transport),
3. the population exposed to concentrations in excess of the standard,
4. the presence and concentration of potentially toxic substances in the mix of particulate emissions in the area, and
5. the technological and economic feasibility of various control measures.

Under the Act, we may grant only one extension for an area and that the extension cannot be for more than 5 years after 2001; that is, the extended attainment date can be no later than December 31, 2006.

EPA's Proposed Policy on Attainment Date Extensions

We first presented our preliminary interpretation of the attainment date extension provision in our proposed approval of the annual standard provisions of the MAG plan. See 66 FR 19992, 19967. Based on comments we received on it during that proposal's comment period, we have clarified certain aspects of the policy but have made no substantive changes to it.

This interpretation is our preliminary view of the section 188(e) requirements and we again request comment on it. In addition, we emphasize that these are our preliminary views and they are subject to modification as we gain more experience reviewing extension requests from other areas.

In the following sections we discuss the five requirements a State must meet before we can consider granting an attainment date extension.

1. Apply for an attainment date extension

The State must apply for an extension of the attainment deadline under section 188(e). The request should be accompanied by the SIP submittal containing the most expeditious alternative attainment date demonstration required by CAA section 189(b)(1)(A)(ii). The state must be provided the public with reasonable notice and a hearing on the request before it is sent to EPA.

It is clear from the wording of section 188(e) that an extension application is not a SIP revision. Under section 188(e), a state *applies* for an extension request: "upon application by the State..." and we *grant* the request: "The Administrator may grant at most one such extension..." Wording later in section 188(e) also makes clear that the application for an extension is distinct from the SIP revision that must accompany it: "at the time of the such application, the State must submit a revision to the implementation plan that includes a demonstration of attainment by the most expeditious alternative date practicable." This attainment demonstration is the one required by section 189(b)(1)(A)(ii).

Although extension requests are not SIP submittals per se and are therefore not subject to the requirements of the Clean Air Act and our regulations for public notice and hearing on SIP revisions. However, because they can greatly affect the content and ultimate approvability of a serious area PM-10 SIP, we believe a state must give the public an opportunity, consistent with the requirements for SIP revisions, to comment on an extension request prior to submitting it to us.

2. Demonstrate that attainment by 2001 is impracticable

In order to demonstrate impracticability, the plan must show that the implementation of BACM on significant (that is, non-de minimis) source categories will not bring the area into

attainment by December 31, 2001. In serious areas, BACM is required to be in place in advance of the 2001 attainment date; therefore, we believe that it is reasonable to interpret the Act to require that a state provide at least for the implementation of BACM on significant source categories before it can claim impracticability of attainment by 2001.¹⁰ This interpretation parallels our interpretation of the impracticability option for moderate PM-10 nonattainment areas in section 189(a)(1)(B). In moderate areas, RACM was required before a moderate area plan could show impracticability of attainment by 1994, the moderate area attainment date. *General Preamble* at 13544. The *Ober II* court found this approach reasonable. *Ober II* at 1198.

The statutory provision for demonstrating impracticability requires that the demonstration be based on air quality modeling. See section 189(b)(1)(A). We have established minimum requirements for air quality modeling. See discussion on air quality modeling later in this TSD.

3. Have complied with all requirements and commitments in its implementation plan

We interpret this criterion to mean that the state has implemented the emissions-reducing measures in the plan revisions it has submitted to address the CAA requirements in sections 172 and 189 for PM-10 nonattainment areas.

The purpose of this criterion is to assure that a state is not receiving additional time to attain because it failed to implement already-adopted or already-committed-to control measures. Given this purpose, we believe our review under this criterion should be limited to the implementation status of control measures from earlier PM-10 plans and not be an expansive review of the implementation status of every provision in submitted implementation plans, whether or not it is an emissions-reducing measure.¹¹

¹⁰ As described in the section on the BACM requirement, if applying BACM-level controls to one or more of the proposed de minimis source categories would result in attainment by December 31, 2001, then those categories are not de minimis (i.e., they are significant) and must have BACM applied to them. Therefore, states cannot use the de minimis exemption to BACM to avoid applying controls that would result in attainment by 2001.

¹¹ For example, CAA section 110(a) requires states to submit SIP revisions providing for, among other things, adequate authority and resources to monitor both ambient air and emissions from individual sources, to collect inventory information, to permit new and modifying sources, and to adopt and enforce air pollution control regulations. These requirements demonstrate that a state has a sufficient authority and resources to run an air pollution control program but are not themselves control measures. Thus under our proposed interpretation of section 188(e), their implementation status is immaterial for the purposes of an extension.

As a practical matter, if a state is unable to meet the minimum program requirements in section 110(a), then it is very unlikely that it would be able to prepare an approvable PM-10 plan

We read this provision not to require the area have a fully approved plan that meets the CAA's requirements for moderate areas. We base this reading on the plain language of section 188(e) which requires the state to comply with all requirements and commitments pertaining to that area *in the implementation plan* but does not require that the state comply with all requirements pertaining to the area *in the Act*. For the same reason, we also read this provision not to bar an extension if all or part of an area's moderate area plan is disapproved or has been promulgated as a FIP or if the area has failed to meet a RFP milestone.

Part of determining whether a state has implemented its commitments and requirements in earlier plans is assessing whether the state retains the legal authority for them and is funding, staffing, and enforcing them at the level assumed or committed to in those plans. Thus any determination that the state has met its commitments and requirements in earlier plans is also a finding that it has retained its legal authority and has met its commitments regarding enforcement, funding, and staffing.¹²

4. Demonstrate the inclusion of the most stringent measures

The fourth extension criterion requires the State to "demonstrate to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area." CAA section 188(e).

The requirement for most stringent measures (MSM) is similar to the requirement for BACM. We define a BACM-level of control to be, among other things, the maximum degree of emission reduction achievable from a source or source category which is determined on a case by case basis considering energy, economic and environmental impacts. *Addendum* at 42010. The Act establishes the deadline for implementing BACM as four years after an area's reclassification to serious. CAA section 189(b)(1)(A).

We propose to define a "most stringent measure" level of control in a similar manner: the maximum degree of emission reduction that has been required or achieved from a source or

in the first place, let alone apply for an extension request, since the ability to collect air quality data, prepare emissions inventories, and adopt and enforce rules, etc. are all prerequisites to developing approvable plans.

¹² We only determine if a state's committed levels of legal authority, funding, staffing, and enforcement for a control measure are adequate under the CAA at the time we approve the measure into the SIP. Where we have not approved a measure in an earlier implementation plan, we are limited under section 188(e) to determining if the state has done what it said it would do rather than what the CAA would require it to do.

source category in other SIPs or in practice in other states and can be feasibly implemented in the area. A MSM then is a control measure that delivers this level of control.

The Act does not specify an implementation deadline for MSM. Because the clear intent of section 188(e) is to minimize the length of any attainment date extension, we propose that the implementation of MSM should be as expeditiously as practicable.

Given this similarity between the BACM requirement and the MSM requirement, we believe that determining MSM should follow a process similar to determining BACM, but with one additional step, to compare the potentially most stringent measure against the measures already adopted in the area to determine if the existing measures are most stringent:

1. develop a detailed emissions inventory of PM-10 sources and source categories,
2. model to evaluate the impact on PM-10 concentrations over the standards of the various source categories to determine which are significant for the purposes of adopting MSM,
3. identify potential most stringent measures in other implementation plans or used in practice in other states for each significant source category and for each measure determine their technological and economic feasibility for the area as necessary,
4. compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source category, and
5. provide for the adoption of any MSM that is more stringent than existing similar local measures and provide for implementation as expeditiously as practicable or, in lieu of adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

The MSM provision only requires that a state consider the best controls from elsewhere in the country for implementation in the area requesting an attainment date extension. It looks to see--and the results are completely dependent on--how well other areas have controlled their PM-10 sources. If other areas have not controlled a particular source or source category well, then the resulting level of control from the MSM will not be the maximum feasible level of control for that source or source category in the local area. Even if they have controlled them well, the resulting level of control may still not be the maximum feasible level because local conditions may allow a higher degree of control than has been achieved elsewhere.

The MSM provision does not require that a state consider if local sources or source categories can be controlled at a level greater than the most stringent level from other areas. In other words, it does not require states to determine and adopt the maximum feasible level of

control that could be applied to a source or a source category given local conditions and the additional implementation time afforded by an extension.

In considering the MSM provision, the inclination is to assume that there are always better controls out there than there are in the local area. This assumption is unwarranted, especially for areas that have already gone through the process of identifying and adopting BACM for their significant sources in order to meet the section 189(b)(1)(B) requirement. These areas are likely to have already evaluated the best controls from other areas and either adopted them as BACM or rejected them as not feasible for their area. As a result, the likelihood of finding substantial new controls during a MSM evaluation in one of these areas is low.¹³

The most promising universe of potential MSM in these areas is the measures that were rejected as BACM on de minimis grounds or because they could not be implemented by the BACM deadline. Therefore, we believe at minimum, more sources and source categories should be subject to the MSM analysis than were to the BACM analysis, by lowering the threshold for what is considered a de minimis source category and 2) any measures garnered from other areas that were rejected during the BACM analysis because they could not be implemented by the BACM-implementation deadline should be reviewed to see if they are now feasible for the area given the longer attainment date. See footnote 7.

De Minimis Thresholds. What constitutes a de minimis source category for BACM is dependent upon the specific facts of the nonattainment problem under consideration. In particular, it depends upon whether requiring the application of BACM for such sources would make the difference between attainment and nonattainment by the serious area deadline. We propose to use a similar approach for judging what constitutes a de minimis source category for MSM but instead of the attainment/nonattainment test, we propose to use the test of whether MSM controls on the de minimis sources would result in more expeditious attainment.

We would not review an MSM analysis in a plan if the plan did not demonstrate expeditious attainment since one prerequisite for granting an Oextension request is that the plan demonstrate attainment. Therefore, any de minimis standard for MSM that relied on the

¹³ There is also an inclination to assume that the MSM requirement is the provision in section 188(e) that implements the Act's general strategy of offsetting longer attainment time frames with more stringent controls and therefore, the MSM requirement must be interpreted to result in the adoption of measures more stringent than BACM. We believe, however, that this offsetting function is actually served by the CAA section 189(b)(1)(A)(ii) requirement for PM-10 plans to demonstrate attainment by the most expeditious date practicable, if attainment by 2001 is impracticable. Because we are required to grant the shortest possible extension, a state must demonstrate that it has adopted the set of control measures that will result in the most expeditious date practicable for attainment. This requirement may very well require that a state adopt controls that go beyond the most stringent measures adopted or implemented elsewhere.

difference between attainment and nonattainment would be meaningless because no additional controls are needed for attainment beyond those already in the plan. Our responsibility under section 188(e), however, is to grant the shortest practicable extension of the attainment date by assuring the plan provides for attainment as expeditiously as practicable. Thus, one means of determining an appropriate de minimis level is to determine if applying MSM to the proposed de minimis source categories would meaningfully expedite attainment. If it did, then the de minimis level is too high, and if it did not, then the de minimis level is appropriate.

Like the RACM and BACM requirements, there is no explicit provision in the Act prohibiting the exemption from the MSM requirement for de minimis sources of PM-10 pollution. We are using here the same principles for determining when a source is considered de minimis under the MSM requirement that we used for the RACM requirement that the *Ober II* court upheld and thus we have constructed the de minimis exemption for the MSM requirement to prevent states from eliminating any controls on sources or source categories that alone or together would result in more expeditious attainment of the PM-10 standards.

Technological feasibility. In the MSM analysis, a state must evaluate the application of controls from elsewhere to sources in its own area. In many cases, these sources are already subject to local control measures. In these situations, part of determining if a control is technologically feasible is determining if the new control can be integrated with the existing controls without reducing or delaying the emission reductions from the existing control. If it cannot, then we would not, in general, consider the measure to be technologically feasible for the area unless the emission benefit of the new measure is substantially greater than the existing measure ¹⁴

Economic feasibility. Because cost is rarely used to justify rejection of a measure in the MAG plan, we will not attempt to establish a general guide for evaluating when a measure is economically infeasible but instead will address the issue on a case-by-case basis as needed.

Judging stringency. The stringency of a control measure is determined primarily by a combination of its applicability and its control requirement, that is, what sources in the category are subject to the measure and what does the measure requires the source to do to reduce emissions. When we use the term “measure” in the context of the MSM requirement, we are

¹⁴ We come to this position by considering the reasonable further progress requirement to assure early emission reductions. In general, public health is better protected by achieving emission reductions early even if that results in a small loss in total reductions than delaying them to gain slightly higher reductions.

referring to this combination; we are not referring to just the control requirement or to individual methods of control.¹⁵

The approach we propose to use in evaluating the selection of the most stringent among multiple measures, *i.e.*, evaluating the determination of when one control measure is more stringent than another, is:

1. If there is only a single measure applicable to a source category then we will compare the measures directly. If there are multiple control measures with diverse controls requirements applicable to a source category (e.g., tailpipe emissions are controlled through fuels, emission standards, inspection and maintenance programs, and transportation control measures) then we will compare measures with similar control requirements against one another. If several measures apply the same or very similar control requirements to a source category, that is they have the same control requirement but different applicabilities (e.g., MCESD Rule 310.01 and City and County commitments all require similar controls on unpaved roads), then we will use the collective stringency of all the measures in the stringency analysis.
2. We will review all the provisions of a rule that apply to a specific type of source (e.g., all the rule provisions that apply to vacant lots) as an inseparable measure. As discussed above a rule's stringency is defined by a combination of its applicability and control requirements (as they apply to a single type of source). They are not separable elements that can be compared in isolation to another rule.¹⁶
3. In a MSM analysis, a measure's stringency should be determined assuming that it is appropriately adopted, implemented and enforced. Thus, we will not use a measure's implementation mechanisms (e.g., rule versus commitment), funding level, compliance

¹⁵ For example: a control measure requires all unpaved roads with ADT over 150 be stabilized by either paving, graveling, or chemical stabilization. The control requirement here is "stabile using one of these three methods: paving, graveling, or chemical stabilization." The applicability is "all unpaved roads with ADT over 150." The individual methods of control here are paving, graveling, and chemical stabilization.

¹⁶ For example, South Coast Rule 403 covers vacant lots, construction sites, and agriculture among other fugitive dust sources. MCESD's Rule 310.01 covers vacant lots and Rule 310 covers construction sites. The Arizona BMP general permit rule covers agricultural sources. Under this test we would evaluate Rule 403's provisions for vacant lots against Rule 310.01 provisions for vacant lots; Rule 403's provisions for construction sites against Rule 310's provisions for construction sites; Rule 403's provisions for agricultural sources against the BMP general permit rule's ones.

schedule, test method, resources available for enforcement, or other similar items as criteria for judging relative stringency.¹⁷

A state may determine which measure or measures are most stringent either qualitatively or quantitatively. It is the state's responsibility, however, to assure that any determination is well documented and persuasive.

Once a state has identified a potential most stringent measure, it must provide for the adoption of any MSM that is more stringent than existing measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

Finally, we address how we view the "to the satisfaction of the Administrator" qualifier on the requirement that the State demonstrate that its plan includes the most stringent measures. The presence and wording of this qualifier indicates that Congress granted us considerable discretion in determining whether a plan in fact provides for MSM. Under the terms of section 188(e), we believe that we can still accept an MSM demonstration even if it falls short of having every MSM possible. To intuit the limits of this discretion, we again look to the overall intent of section 188(e) that we grant as short an extension as practicable and to how we have interpreted the CAA's other general control requirements, RACM and BACM.

In concrete terms, this means that when judging the overall adequacy of the MSM demonstration, we will give more weight to a failure to include MSM for source categories that contribute the most to the PM-10 problem and to the failure to include measures that could provide for more expeditious attainment and less weight to those measures for source categories that contribute little to the PM-10 problem and would not expedite attainment.

5. Demonstrate attainment by the most expeditious alternative date practicable

Section 189(b)(1)(A) requires that a serious area plan demonstrate attainment by the most expeditious date practicable using air quality modeling after December 31, 2001. This demonstration is the final criterion that must be met before we may grant an extension request.

There are two parts to reviewing a modeled attainment demonstration: evaluating the technical adequacy of the modeling itself, and evaluating the control measures that are relied on to demonstrate attainment.

¹⁷ However, once a State determines a measure is a feasible most stringent measure, it must convert the measure into a legally enforceable form and provide the necessary level of resources, etc. to ensure its implementation.

We have established technical requirements for modeling PM-10 in SIP attainment demonstrations. Please see discussion later in this TSD on modeling requirements for PM-10 SIPs.

In evaluating the control measures relied on in the attainment demonstration, we determine whether the following are true:

1. We have approved it into the SIP or the State has submitted it to us for approval into the SIP and we have proposed it for approval..
2. It is enforceable under our SIP-enforceability standards or qualifies to be credited under our mobile source voluntary measures policy.¹⁸
3. The plan provides reasonable assurances, including funding and other resource commitments, that it will be implemented and enforced.
4. It will be implemented on the most expeditious schedule practicable.
5. The emission reductions credited to it are reasonable and consistent with the implementation resources and schedule, and for any reductions coming from mobile source voluntary measures, that they do not collectively exceed 3 percent of the total reductions needed for attainment.¹⁹

Our determination of whether the plan provides for attainment by the most expeditious date practicable will depend on whether we find that the plan provides for appropriate BACM, MSM, and any other technologically and economically feasible measures that will result in attainment as expeditiously as practicable and that these measures are implemented on an expeditious schedule.

¹⁸ *Memorandum*, Richard D. Wilson, Acting Assistant Administrator for Air and Radiation, to EPA Regional Administrators, 1 - 10, "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in State Implementation Plans (SIPs)," October 24, 1997.

¹⁹ *Ibid.*, page 5.

Section 4 – Detailed Evaluation of the MAG Serious Area PM-10 Plan

In this section, we present our provision-by-provision evaluation of the MAG plan's compliance with the CAA's requirements for attaining the 24-hour PM-10 standard. For each provision, we discuss the applicable statutory and policy requirements, describe how the plan addresses each requirement, and our proposed conclusion as to whether the plan meets the statutory and policy requirements.

Throughout this section we will cite elements of the revised MAG plan using the following conventions:

MAG plan: *Revised Maricopa Association of Governments 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area*, MAG, February 2000.

MAG TSD: "Revised Technical Support Document for Regional PM-10 Modeling in Support of the Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area," MAG, December 1999, found in Appendix A, Exhibit 7 of the MAG plan.

ADEQ TSD: "Evaluation for Compliance with the 24-hour PM-10 Standard for the West Chandler and Gilbert Microscale Sites," ADEQ, June 1999, found in Appendix C, Exhibit 3 of the MAG plan.

BMP TSD: *Maricopa County PM-10 Serious Area SIP Revision for Agricultural Best Management Practices*, ADEQ, June 13, 2001

Ag Quantification TSD: URS Corporation and Eastern Research Group, *Technical Support Document for Quantification of Agricultural Best Management Practices*, Final, June 8, 2001 found in Enclosure 3, Attachment 5 of the June 13, 2001 BMP SIP submittal.

Microscale plan: *Final Plan for Attainment of the 24-hour PM-10 Standard - Maricopa County Nonattainment Area*, ADEQ, May 1997.

Microscale TSD: *Maricopa County PM-10 SIP, Microscale Approach Technical Support Document*, ADEQ, May 1997 found in Appendix A of the Microscale plan.

1994 Regional PM-10 Inventory: "1994 Regional PM-10 Emissions inventory for the Maricopa County Nonattainment Area, Draft Final Report," MAG, September 1997, found in Appendix A, Exhibit 6 of the MAG plan.

MSM Study: “Most Stringent PM-10 Control Measure Analysis,” Sierra Research, May 13, 1998, found in Appendix C, Exhibit 4 of the MAG plan.

[Agency] Commitment: The set of commitments from the City, Town, County of Maricopa, ADOT, ADEQ, other agency to PM-10 control measures. These commitments can be found, grouped by agencies, in the four volumes that comprise Chapter 12 of the MAG plan and in the December 1997 submittal.

Outline of Section 5

Baseyear PM-10 Emissions inventory

Ambient Air Quality Surveillance

BACT for Major Stationary Sources of PM-10 Precursors

BACT for Significant Stationary Sources of PM-10

BACM Analysis

- Step 1, Develop an Emissions inventory
- Step 2, Model to Identify Significant Sources
- Step 3, Identification of Potential BACM Measures

Implementation of BACM and Inclusion of MSM for

- On-Road Motor Vehicle Exhaust (Technology standards)
- On-Road Motor Vehicle Exhaust and Paved Road Dust (TCMs)
- Nonroad Engines
- Paved Road Dust
- Unpaved Parking Lots
- Disturbed Vacant Land
- Unpaved Roads
- Construction Activities and Sites
- Agricultural Sources
- Residential Wood Combustion
- Secondary Ammonium Nitrate

MCESD’s Commitments to Improve Compliance and Enforcement of the Fugitive Dust Program

Extension Request

- Application
- Demonstrate the Impracticability of Attainment by December 31, 2001

Complied with All Requirements and Commitments in Its Implementation Plan
Demonstrate the Adoption of the Most Stringent Measures
Demonstrate Attainment by the Most Expeditious Alternative Date Practicable after
December 31, 2001

Air Quality Modeling

Attainment Demonstration Control Measures

Other Factors that EPA May Consider in Granting an Extension Request

Summary of Proposed Findings on Arizona's Extension Request

Reasonable Further Progress and Quantitative Milestones

Contingency Measures

General SIP Requirements: Adequate Personnel, Funding, and Authority and Description of the

Enforcement Methods and State Back-Up Authority

BASEYEAR AND MODELING PM-10 EMISSIONS INVENTORIES

Requirement: CAA section 172(c)(3): Each nonattainment area plan shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant(s) in such area.
CAA section 189(b)(1)(A): PM-10 serious area plan shall include a demonstration, based on air quality modeling, that the plan provides for attainment as expeditiously as practicable.

Proposed Action: Not Applicable (see below)

Primary Guidance *PM-10 Emissions inventory Requirements*, EPA, OAQPS, EPA-454/R-94-

Documents: 033 (September, 1994) available at <http://www.epa.gov/ttn/chief>.

Primary Plan Cites: 1994 Regional PM-10 Inventory found in Appendix A, Exhibit 6 of the MAG plan
Chapter 4 in the Microscale TSD
Chapter 3 in the ADEQ TSD

What are the statutory and policy requirements for emissions inventories?

CAA section 172(c)(3) requires that nonattainment area plans include a comprehensive, accurate, and current inventory of actual emissions from all sources in the nonattainment area. To meet this requirement Arizona submitted a 1994 base year inventory as part of the MAG plan. See MAG plan, Appendix A, Exhibit 6. We proposed to approve this inventory as meeting the requirements of section 172(c)(3) as part of our proposal on the annual standard provisions. See 65 FR 19964, 19970. We are not reproposing action on the regional inventory as part of the proposal on the 24-hour standard. No additional proposal is necessary because the state has not submitted a new inventory and we have not revised our evaluation of the 1994 base year inventory.

We are reiterating our evaluation of the regional inventory and the modeling inventories derived from it because of the fundamental role emissions inventories play in air quality modeling. CAA section 189(b)(1)(A) requires attainment demonstrations in PM-10 serious area plan to be based on air quality modeling. We cannot find the modeling approvable, or the attainment demonstrations that are derived from that modeling approvable, without first finding that the underlying emissions inventories are adequate.

Our policies require that the inventory be fully documented. PM-10 EI Requirements, section 4.1. This documentation is needed to assure us and the public of the reasonableness of

the methodologies and assumptions used to create the estimates. The documentation should include the sources of the emissions, emission factors, activity and growth data, and the control and rule effectiveness factors used to develop the inventory. PM-10 EI Requirements, p. 19. An EPA document that illustrates our expectation with regard to SIP inventory documentation is *Example Documentation Report For 1990 Base Year Ozone And Carbon Monoxide State Implementation Plan Emissions inventories*, EPA-450/4-92-007 dated March 1992 (which can be found on our website at the above Internet website).

How are these requirements addressed in the plan?

In the Phoenix nonattainment area, two different inventories are needed to accurately reflect the sources that are contributing to ambient levels of the 24-hour PM-10 standard. The first is the regional average annual day inventory which contains emission rates for all emission sources across the entire nonattainment area on an average day. This is the inventory required by CAA section 172(c)(3).

The second is an inventory of emission sources in the area directly around a monitor that exceeds the 24-hour standard on the day that records an exceedance. In Phoenix area, 24-hour exceedances are related to fugitive dust sources near the monitor; therefore, a subregional or “microscale” inventory is necessary to evaluate 24-hour exceedances. This microscale inventory is a modeling inventory and is not intended to satisfy the CAA section 172(c)(3) requirement.²⁰

The MAG plan describes annual and average annual day emissions for 1994 from point, area, nonroad, onroad, and nonanthropogenic sources in the Maricopa County portion of the 2,880 square mile nonattainment area. The inventory includes emissions of PM-10, PM-2.5, ammonia (NH₃), nitrogen oxides (NO_x), and sulfur oxides (SO_x). Inventoried are 73 point sources, reentrainment from paved and unpaved roads, fugitive dust from agricultural tilling and harvesting, process fugitives from 214 facilities, wildfires, microbial activity in the soil, and emissions from many other source categories. The 1994 inventories did not include windblown fugitive dust emissions because an average day in Maricopa County was not windy. See 1994 Regional PM-10 Inventory, page 3-4 (Table 3-1).

MAG developed inventories for 1995 (the modeling base year), 2001 (impracticability demonstration) and uncontrolled and controlled 2006 (attainment year) and used them to develop the modeling inputs for the control strategy demonstration(s). The MAG inventories included windblown fugitive emissions. See MAG TSD, chapter VI.

²⁰ By design and need, the microscale inventory includes only sources within a small area around a monitor rather than all sources within the entire nonattainment area as required by CAA section 172(c)(3).

ADEQ developed microscale and subregional inventories for 1995 (the modeling base year) for the West Chandler and Gilbert microscale sites. See Microscale TSD, Chapter 4 and ADEQ TSD, chapter 3. In the 1997 Microscale plan, ADEQ also developed 1995 inventories for the two other microscale sites, Maryvale and Salt River. See Microscale TSD, Chapters 4 and 6. We evaluated the 1995 inventories for all four sites as part of our action on the overall Microscale plan. See 62 FR 31025, 31030.

Trivial and Uninventoried Source Categories. Not included in the regional inventories are emissions from aircraft landings and take-offs (because emission factors are not available) and other unspecified trivial source categories. Emissions from all sources of volatile organic compounds (VOC) were not considered to be a significant contributors to PM-10 levels. See MAG plan, page 3-2. Not included in the microscale inventories were non-wind blown sources that contributed to background concentrations at each microscale site. These sources were accounted for in the background concentration which was added to the results of the microscale modeling to obtain the total ambient concentration in the microscale area.

Point Source Emissions. Point source emissions were derived from annual source emission reports,²¹ MCESD investigation reports, permit files and logs and telephone contracts with sources. 1994 Regional PM-10 Inventory, page 3-2. The MAG plan lists emissions for facilities which emit more than 5 tons per year of PM-10 or NH₃ and more than 10 tons per year of NO_x or SO_x. These emissions are for sources well under our required 70 ton/year cut-point for major point sources. Only two major stationary sources (≥ 70 tons/year of PM-10) currently exist within the nonattainment area. One of these, Arizona Public Service (APS) - West Phoenix has converted to gas combustion, but was not in operation in the 1995-1998 period.

An Example of Documentation - Paved Roads. The silt content on paved roads was varied by roadway vehicular load (based on AP-42 and Engineering-Science references). The silt content (11.9%) was based on local data. EPA's PART 5 & MOBILE 5a were used (presumably with 49 state fuels), as was the KVB (1979, CARB) estimate of size speciation weight fractionation (see MAG plan, Appendix A of Exhibit A). The average weekday traffic volumes were multiplied by a factor of 0.91 to obtain average "total day" (daily) traffic volumes based on a 1992 reference. See 1994 Regional PM-10 Inventory, page 6-3.

Table EI-1 summarizes the 1994 average annual PM-10 inventory. Tables EI-2 through EI-4 summarize the 1995, 2001, and uncontrolled 2006 PM-10 modeling average day inventories. For all years, the regional inventory is dominated by construction-related fugitive dust and paved and unpaved road dust.

²¹ MCESD Rule 100, section 505.1 requires sources to annually report on their actual emissions.

TABLE EI-1 REGIONAL 1994 AVERAGE ANNUAL DAY PM-10 INVENTORY FOR THE MARICOPA COUNTY PORTION OF MARICOPA PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER AVERAGE DAY	PERCENT OF OVERALL INVENTORY
Stationary point sources	3.9	2.7
Stationary area sources	8.7	6.1
Nonroad mobile exhaust	10.1	7
Construction fugitive dust/trackout	29.0	20.1
Paved road dust	56.4	39.1
Unpaved road dust	31.1	21.6
On-road vehicle exhaust	4.8	3.3
Wild fires	0.1	0.1
Total	144.1	100

Source: 1994 Regional PM-10 Inventory, Table 2-3.

TABLE EI-2 REGIONAL 1995 AVERAGE ANNUAL DAY PM-10 MODELING INVENTORY FOR THE MARICOPA COUNTY PORTION OF MARICOPA PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER DAY	PERCENT OF OVERALL INVENTORY
Stationary point sources	2.9	1.5
Stationary area sources	14.6	7.7
Nonroad mobile exhaust	8.2	4.3
Construction fugitive dust/trackout/windblown	73.7	38.7
Paved road dust	33.8	17.7
Unpaved road dust	24.6	12.9

TABLE EI-2 REGIONAL 1995 AVERAGE ANNUAL DAY PM-10 MODELING INVENTORY FOR THE MARICOPA COUNTY PORTION OF MARICOPA PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER DAY	PERCENT OF OVERALL INVENTORY
On-road vehicle exhaust	4.3	2.3
Windblown from vacant land, agricultural fields and fluvial channels	28.4	14.9
Total	190.6	100

Source: MAG TSD, Table II-1.

TABLE EI-3 REGIONAL 2001 UNCONTROLLED AVERAGE ANNUAL DAY PM-10 MODELING INVENTORY FOR THE MARICOPA COUNTY PORTION OF MARICOPA PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER DAY	PERCENT OF OVERALL INVENTORY
Stationary point sources	3.2	1.6
Stationary area sources	13.6	6.9
Nonroad mobile exhaust	9.2	4.6
Construction fugitive dust/trackout/windblown	82.1	41.4
Paved road dust	39.3	19.8
Unpaved road dust	26	13.1
On-road vehicle exhaust	3	1.5
Windblown from vacant land, agricultural fields and fluvial channels	22	11.1
Total	198.4	100

Source: MAG TSD, Table II-2

TABLE EI-4 REGIONAL 2006 UNCONTROLLED AVERAGE ANNUAL DAY PM-10 MODELING INVENTORY FOR THE MARICOPA COUNTY PORTION OF MARICOPA PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER DAY	PERCENT OF OVERALL INVENTORY
Stationary point sources	3.4	0.7
Stationary area sources	13.1	6.2
Nonroad mobile exhaust	10.2	4.8
Construction fugitive dust/trackout/windblown	92.2	43.8
Paved road dust	43	20.4
Unpaved road dust	27.5	13.1
On-road vehicle exhaust	2.7	1.3
Windblown from vacant land, agricultural fields and fluvial channels	18.4	8.7
Total	210.5	100

Source: MAG TSD, Table II-3

Tables EI-5 through 7 show the design day (e.g., the 1995 modeling) emissions inventories at each microscale site. For all years, fugitive dust emissions from disturbed lands dominate the microscale emissions inventories.

TABLE EI-5 1995 DESIGN DAY MICROSCALE MODELING INVENTORIES FOR THE WEST CHANDLER AND GILBERT MONITORING SITES (METRIC TONS PER DAY)		
SOURCE	WEST CHANDLER	GILBERT
Agriculture	19.378	--

TABLE EI-5 1995 DESIGN DAY MICROSCALE MODELING INVENTORIES FOR THE WEST CHANDLER AND GILBERT MONITORING SITES (METRIC TONS PER DAY)		
SOURCE	WEST CHANDLER	GILBERT
Vacant land	6.188	--
Road Construction	4.397	--
Agricultural Apron	1.954	0.165
Unpaved Roads	0.049	0.002
Paved Roads	0.037	0.005
Cleared Areas (construction site)	--	0.076
Unpaved parking lots	--	0.19

Source: Microscale TSD, Tables 4-4 and 4-6

TABLE EI-6 1995 DESIGN DAY MICROSCALE MODELING INVENTORIES FOR THE MARYVALE MONITORING SITE	
SOURCE	METRIC TONS PER DAY
Unpaved Roads	0.003
Paved Roads	0.009
Cleared Areas (construction site)	1.706

Source: Microscale TSD, Table 4-5

TABLE EI-7 1995 DESIGN DAY MICROSCALE MODELING INVENTORIES FOR THE SALT RIVER MONITORING SITE	
SOURCE	METRIC TONS PER DAY
Land fill remediation (earthmoving)	0.745

TABLE EI-7 1995 DESIGN DAY MICROSCALE MODELING INVENTORIES FOR THE SALT RIVER MONITORING SITE	
SOURCE	METRIC TONS PER DAY
Unpaved parking lots	0.691
Construction	0.588
Unpaved Roads	0.467
Primary paved roads	0.263
Surface mining	0.242
Industrial areas	0.144
Industrial haul roads	0.105
Industrial point sources	0.047
Secondary paved roads	0.028
Industrial yard activities	0.012
Paved parking lots	0.004

Source: Microscale TSD, Table 6-9

Does the plan meet the statutory and policy requirements for emissions inventories?

We proposed to approve the 1994 base year regional inventory as meeting the requirements of CAA section 172(c)(3) as part of our proposed action on the annual standard provisions in the MAG plan. See 65 FR 19964, 19970. As part of our action on the Microscale plan, we have also previously reviewed and accepted the 1995 design day modeling inventories at each microscale site. See 62 FR 41856 and the TSD for that action. We are not reproposing these approvals in this action on the 24-hour standard provisions.

Documentation. Generally the inventories are very well documented and in fact are better documented than most others received by this Regional Office. The documentation exceeds the EPA guidance policies.

Current. To evaluate whether the selected base year is current for the purposes of this plan, we must review it in the context of the plan's preparation. The base year emissions inventory is the foundation for any nonattainment plan and the first piece that must be prepared.

The rest of the plan--the modeling, control measure analysis, attainment demonstrations, etc.--all are derived from or depend on the base year emissions inventory; therefore, it must be developed and fixed early in the planning process.

The Phoenix area was reclassified from moderate to serious in May, 1996. The reclassification established the date for submittal of the plan at 18 months after the reclassification, December 1997. In order to develop its attainment demonstration, which must be based on air quality modeling, MAG needed to take the base year inventory, revise it for input to the modeling, develop the model and validate it, evaluate potential controls, select and gain commitments for those controls, and then model the effectiveness of those controls on air quality. This process is a lengthy one. To make the December 1997 deadline, MAG needed to start development of the plan in early 1996.²² Inventories themselves take about one year to develop, so 1994 is the most current year that MAG plan could have used.

We believe that 1994 is a current base year for this plan given that the technical analysis for the plan started in 1996 and that the base year inventory was the necessary starting element for this analysis and thus needed to be available in early 1996.

Comprehensive. The MAG plan inventories are very complete, considering a few emission factors are unknown for some of the smaller sources of PM-10. Trivial emission categories are never listed in an inventory.²³ (See additional comments, below.) We concur with the finding that there is a negligible impact on ambient measurements of PM-10 from VOC aerosol and thus VOC source need not be inventoried for the PM-10 plan.

Accurate. In developing the inventory, MAG and MCESD closely followed our guidance relative to the use of emission factors, activity estimates, and growth and control factors, and the other source specific emission estimation methodologies (continuous emission monitoring, annual stack tests, and mass balance methods). Source specific methods were used to the maximum extent possible as they are inherently more accurate than emission factors. The

²² The fact that the final, complete plan was not submitted until June 1999 (and subsequently revised and resubmitted in February 2000) does not negate this analysis. The plan was not submitted in December 1997 because the modeling analysis showed that the State needed to apply for an extension under section 188(e) and that additional substantial work needed to be done for this extension.

²³ For example, cigarette smoke was included in one inventory in the past, probably as the result of a public comment or litigation. Such source categories are truly trivial in compared to the magnitude of the other sources of the *ambient* air quality problem. An April 1988 final report by Radian Corporation, ARB Contract No. A5-147-32, *Evaluation of Emissions from Selected Uninventoried Sources in the State of California* makes just this point.

relative accuracy of each estimate underwent the prescribed quality assurance procedures to eliminate all possible errors.

The accuracy of an inventory category estimate is directly related to how difficult it is to either obtain an emission estimate or to study the factors influencing the magnitude and frequency of the sources of PM-10. Much activity data is highly speculative and the accuracy of all emission factors is unknown. The rule effectiveness factor we suggest states use (80 percent) relates to the degree of compliance, and high emission periods experienced during start-up and shut-down and under upset-breakdown conditions, with existing/future measures. In all cases, we recommends the use of local data and estimates whenever possible. Accounting for both over and under compliance is highly speculative at best. For all of the above reasons, plans are trial and error descriptions of how and when the contributing emissions will be reduced so as to attain and maintain the NAAQS.

The inventories used in the MAG plan are as accurate as inventories can get.

Additional Information

Ambient Monitoring and Emissions inventories

Two comments received on the proposed approval of the MAG plan's provisions for the annual standard asserted that the regional inventory cannot be comprehensive and accurate because the ambient monitoring network allegedly does not properly monitor the impact of stationary sources. These comments show that we need to explain the relationship between ambient air quality monitoring and emissions inventories.

The ambient air quality networks required by EPA regulation are used to determine the concentration of a pollutant in the air. This monitoring, however, is not and cannot be used to determine the emissions from an individual source or source category.²⁴

For an emissions inventory, we determine how much a source emits of a pollutant in a given time period, e.g., tons per day, pounds per hour. In ambient monitoring, we determine the concentration of pollutant in air, e.g., micrograms per cubic meter ($\mu\text{m}/\text{m}^3$), parts per million (ppm). We can predict the effect of a source's emission on ambient air quality by using air quality modeling; however, we have no tools to determine a source's emissions from ambient monitoring.

²⁴ The confusion may arise because large stationary sources are generally required to "monitor" their emissions. This type of monitoring is different from ambient air quality monitoring. Stationary source monitoring can be done in several different ways including continuous emissions monitoring in stacks and/or keeping records that allow emission rates to be calculated.

A pollutant's concentration in the ambient air is the result of emissions from many individual sources. This is especially true in an urban environment where there are literally thousands of individual emitting sources. General ambient monitoring, that is monitoring only for a specific pollutant like PM-10, cannot distinguish between these sources. It can determine the total ambient impact of all sources but cannot determine the individual impact of a single source.

A source's impact on air quality at any given time is depended, not only on its emissions rate, but also on factors such the height the emissions are emitted, the speed at which they are emitted, the size distribution of the particulate emitted, its distance from the monitor, and most importantly, meteorological conditions at that time. For example, the windier it is, the quicker and more widely a source's emissions are dispersed into the air and the lower its impact on ambient air quality. So, even if we were able to isolate a single source's impact on air quality through ambient monitoring, we could not determine its emissions rate without knowing, at minimum, the actual meteorological conditions. Moreover, the calculation of a source's emissions would be highly dependent on the assumptions regarding these conditions, resulting in a high degree of uncertainty to any emissions estimate.

Because we cannot use general ambient monitoring to determine emissions from individual sources, deficiencies in a monitoring network do not affect the quality of the emissions inventory.

Comparison of the 1989 and 1994 Inventories

One comment received on the proposed approval of the MAG plan's provisions for the annual standard stated that the MAG plan fails to account for the large disparities seen in the 1989 inventory in the 1991/93 moderate area PM-10 plan--an inventory that was based on receptor modeling--and the 1994 inventory in the MAG plan which is based on emission factors. The commenter gave an example of this disparity that the inventory submitted by Arizona in its 1991/93 moderate area plan showed vehicular emissions constituting 36 percent of total emissions but the MAG plan showed only a 3.3 percent contribution. We explain the "disparities" below.

A. Receptor modeling cannot be used to determine the inventory for an area as large and as diverse as the Phoenix PM-10 nonattainment area. The inventory in the 1991/93 PM-10 moderate area plan is a 1989 regional inventory that was prepared using the same methodology as the 1994 inventory and then modified ("normalized") to reflect a 1989-1990 source apportionment. See Moderate area plan, pp. 9-32 to 9-42. The source apportionment was the percent contribution from various emission sources to the monitored ambient concentrations, at three urban Phoenix monitors: Central Phoenix, West Phoenix, and South Scottsdale. The source apportionment was determined by using Chemical Mass Balance (CMB) receptor model

and monitored speciated data.²⁵ This modeling only determined the source apportionment, it did not determine emission levels. The normalized emission levels were calculated by taking the regional inventory total (which was determined through standard emissions inventorying techniques) and multiplying it by the percent contributions from the urban monitors. Because the normalized inventory in the 1991/93 plan underwent this additional step, it is not directly comparable to the 1994 inventory.

The 1994 regional emissions inventory was prepared following the procedures in EPA guidance, using either EPA emission factors or other appropriate emission factors combined with Phoenix-specific activity data to estimate emissions from each type of emissions source. This approach is the customary method used for preparing regional emissions inventories and the one required by EPA guidance.

As work has been done to evaluate the nature of the PM-10 problem in Phoenix, it has become increasingly clear that PM-10 exceedances in Phoenix area often have highly localized causes. In other words, the sources that contribute substantially to an exceedance are often located close to the exceeding monitor. As a result, any inventory that is developed based on the source apportionment from a given monitor or small set of similar monitors only reflects the relative significance of sources around those monitors rather than about the relative significance of sources on a regional basis.²⁶

Phoenix has a large number of fugitive dust sources such as construction sites, vacant lots, unpaved roads, and agricultural fields. Emissions from these sources need to be included in any regional inventory. However, as noted in our proposed action on the Microscale plan, fugitive dust PM-10 has more localized effects than other criteria pollutants because it is emitted near ground level and settles quickly to the ground within a short distance from the source. See

²⁵ Receptor modeling can only provide the percent contribution of sources to ambient concentrations. It cannot provide the sources' actual emission rates, that is, it cannot tell us how many tons per day are being emitted from each source.

²⁶ We can present a graphic example of this. During its analysis of a 24-hour exceedance at the Gilbert monitoring site, ADEQ concluded that 26 percent of the exceedance was due agricultural field aprons, 24 percent was due to unpaved parking lots, 7 percent from vacant disturbed lands, 1 percent from unpaved roads, and 42 percent from all other sources. See Microscale plan, p. 18 (concentrations converted to percentages). If we used this source apportionment to determine the regional inventory for Phoenix, then we would need to conclude that 26 percent of all emissions in the Phoenix area came from agricultural field aprons, 24 percent from unpaved parking lots, 7 percent from vacant disturbed lands, 1 percent from unpaved roads, and 42 percent from all other sources combined (that is, from construction, paved road dust, industrial activities, nonroad engines, on-road engines, etc.). This distribution of emissions is nonsensical given even a basic knowledge of the Phoenix area.

62 FR 31025, 31030. Consequently, it would be surprising to see a substantial contribution from fugitive dust sources at urban monitors where the area is already fully developed and there are few fugitive dust sources, such as vacant lots, construction sites, or unpaved roads.

The source apportionment at urban monitors is much more influenced by local sources such as paved road dust and by regional fine particulate sources such as vehicle exhaust which tend to remain suspended in ambient air for longer distances. This is exactly the source apportionment seen at the three urban monitors used to generate the 1991/93 Plan normalized inventory. As a result, it is not surprising to see that the normalized inventory in the 1991/93 plan is skewed toward paved road dust and vehicle exhaust and away from fugitive dust.

Basing the regional inventory on the source apportionment at urban monitors, however, will underestimate regional fugitive dust emissions. This underestimation is illustrated in the 1991/93 plan normalized inventory where fugitive dust sources account for only 3 percent of the total regional PM-10 emissions in that inventory, a contribution that does not tally with the number of fugitive dust sources in the Phoenix area and the emission rates of these types of sources.

Source apportionment at a monitor is a necessary part of preparing a PM-10 attainment demonstration because without a clear understanding of the relative contributions of sources causing an exceedance, it is impossible to know how controls will affect air quality.²⁷ But in preparing a regional inventory for an area as large and as diverse as Phoenix, with its many fugitive dust sources, source apportionment based on just a few urban monitors is very unlikely to result in a regional inventory that correctly accounts for fugitive dust emissions.²⁸

B. The regional inventories in the 1991/93 Plan and the MAG Plan are consistent. The 1991/93 plan does include a 1989 regional emissions inventory that was prepared in the same manner as the 1994 regional inventory; that is, by using emission factors and Phoenix-specific activity data. This inventory, rather than the normalized inventory, is directly comparable to the 1994 inventory. When this comparison is made, the inventories demonstrate essentially the same source distribution. See Table EI-8.

²⁷ In the 1991/93 plan, the primary purpose of the normalized inventory was to evaluate the effects of controls for the impracticability demonstration. See 1991/93 Plan, p. 9-39.

²⁸ Moreover, because such an approach would only reflect emission sources close to the selected monitor or monitors and not throughout the entire nonattainment area, it would conflict with the requirement in CAA section 172(c)(3) for a comprehensive and accurate inventory of *all* emission sources in the nonattainment area.

TABLE EI-8 COMPARISON OF 1989 REGIONAL PM-10 INVENTORY AND 1994 REGIONAL PM-10 INVENTORY		
CATEGORY	1989 PERCENTAGE OF NON- WINDBLOWN ANNUAL INVENTORY	1994 PERCENTAGE OF NON- WINDBLOWN ANNUAL INVENTORY
Paved road dust	32.8	39.7
Unpaved road dust	28.9	22
Construction/earthmoving	13.7	20.3
Agricultural operations	12.6	4.2
Wood burning	0.7	0.6
Gasoline on-road vehicles	3.3	0.7
Diesel on-road vehicles	4.9	2.8
All nonroad	1.2	6.2
All other	1.9	3.5
Total Inventory	40,975 english tons/year	51,545 metric tons/year ²⁹ (56,700 english tons/year)

Sources: Moderate Area plan, p. 9-22 and 1994 Regional PM-10 Inventory, p. 2-3

The difference in total annual emissions between the two inventories is almost all due to greatly increased estimates of paved road dust (which increased 9,100 eng tons/year), construction-related dust (which increased 5,900 eng tons/year) and nonroad mobile sources (which increased by 3,100 eng tons/year). The differences between the two inventories reflect first the different base year (1989 versus 1994) and second, and more importantly, greatly improved inventorying techniques including the release of PART5, EPA model for calculating on-road motor vehicle emissions including paved road dust, and the availability for the first time of a comprehensive national inventory of nonroad engines.

Even with these changes in inventory techniques, these two inventories draw the same conclusions regarding the relative importance of sources to the overall PM-10 inventory. Both

²⁹ The 1989 inventory is in english tons while the 1994 inventory is in metric tons. One metric tons is equal to 1.1 english tons.

consider paved road dust, unpaved road dust, construction, and agricultural operations in that order to be the dominate sources of PM-10 emissions in the Phoenix area with these four categories collectively contributing 88 percent of the inventory in 1989 and 86.2 percent in 1994. Similarly, the total contribution from on-road vehicles and nonroad engines to the overall inventory remains relatively constant between 1989 (9.4 percent) and 1994 (9.7 percent).

This section prepared by Morris Goldberg and Frances Wicher.

AMBIENT AIR QUALITY SURVEILLANCE

Requirement: CAA section 110(a)(2)(B): State must provide for the establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, compile, and analyze data on ambient air quality and, upon request, make such data available to the Administrator.

40 CFR 58 - Ambient Air Quality Surveillance

Proposed Action: Not applicable.

Primary Guidance Documents: *Network Design and Optimum Site Exposure Criteria for Particulate Matter* (EPA-450/4-87-009, May 1987)

Primary Plan Cites: MAG plan, p. 3-6 to 3-15

What are the statutory, regulatory and policy requirements?

The CAA requires States to establish and operate air monitoring networks to compile data on ambient air quality for all criteria pollutants. Section 110(a)(2)(B)(i). Our regulations in 40 CFR 58 establishes specific regulatory requirements for operating air quality surveillance networks to measure ambient concentrations of PM-10, including measurement method requirements, network design, quality assurance procedures, and in the case of large urban areas, the minimum number of monitoring sites designated as National Air Monitoring Stations (NAMS). We evaluate these four basic elements in determining the adequacy of an area's PM-10 monitoring network.

Under our regulations, states are required annually to prepare and submit network evaluation reports. These report describe the monitoring network and how it meets our regulations. We use these annual reports to assure that state and local ambient air quality monitoring networks meet our regulations and the CAA. Annual reporting is necessary because networks need to be dynamic and sites may be relocated over time as changes in demographics and emission source locations occur in the planning area.

Nonattainment area plans developed under title I, part D of the Clean Air Act are not, in general, required to address how the area's air quality network meets our monitoring regulations. These plans are submitted too infrequently to serve as the vehicle for assuring that monitoring networks remain current. We discuss the adequacy of the monitoring network in this TSD to support our finding that the plan appropriately evaluates the PM-10 problem in the Phoenix area.

Reliable ambient data is necessary to validate the base year air quality modeling which in turn is necessary to assure sound attainment demonstrations.³⁰

How are these requirements addressed in the plan?

The MAG plan does not specifically address the adequacy of the PM-10 monitoring network in the Phoenix area. It does describe the network as of April, 1999 and provides monitoring results for 1994 to 1998. See MAG plan, pp. 3-16 to 3-15.

Does the PM-10 Monitoring Network meet the statutory and regulatory requirements?

Ambient Monitoring

PM-10 in the ambient atmosphere is measured using methods designated by us under the requirements of 40 CFR 53. All of the PM-10 methods used in the Phoenix area are designated as either reference or equivalent methods.³¹ Both the MCESD and the ADEQ have Quality Assurance Plans in place that we have approved. These agencies also submit annual reports to us describing the overall ambient monitoring networks they operate in the Phoenix area and how they meet the relevant EPA requirements.

40 CFR 58, Appendix D details the requirements for designing an ambient monitoring network for PM-10. Further guidance is provided in the document "Network Design and Optimum Site Exposure Criteria for Particulate Matter", (EPA-450/4-87-009, May 1987).

In 1995, our regulations at 40 CFR 58, Appendix D required States to design and operate monitoring networks to address four basic monitoring objectives. They are: 1) to determine the highest concentrations expected to occur in the area covered by the network; 2) to determine representative concentrations in areas of high population density; 3) to determine the impact on ambient pollution levels of significant sources or source categories; and 4) to determine general background concentration levels. In 1997 we revised those regulations to include two additional objectives: 5) to determine the extent of regional pollution transport among populated areas and in support of secondary [National Ambient Air Quality] standards; and 6) to determine the

³⁰ Ambient networks do not need to meet all our regulations to be found adequate to support air quality modeling. A good spatial distribution of sites, correct siting, and quality-assured and quality-controlled data are the most important factors for air quality modeling.

³¹ A reference method is an air sample collection and analysis method which follows the procedures detailed in the appendices to 40 CFR 50. An equivalent method is an air sampling collection and analysis method which does not follow the reference procedures in 40 CFR 50, but has been certified by the EPA as obtaining "equivalent" results.

welfare-related impacts in more rural and remote areas (such as visibility impairment and effects on vegetation).

Closely associated with the monitoring objectives is the concept of “spatial scale of representativeness”. The goal in siting monitoring stations is to correctly match the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for the monitoring objective of the station. Thus, spatial scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring station throughout which actual pollutant concentrations are reasonably similar. The six spatial scales defined in our regulations are as follows:

Microscale - defines an area up to 100 meters from the PM-10 sampler.

Middle Scale - defines an area ranging from 100 meters to 0.5 kilometers from the sampler.

Neighborhood Scale - defines an area ranging from 0.5 to 4.0 kilometers from the sampler.

Urban Scale - defines an area ranging from 4 to 50 kilometers from the sampler. This scale usually requires more than one site for definition.

Regional Scale - defines usually a rural area of reasonably homogenous geography and extends from tens to hundreds of kilometers.

National and Global Scales - these measurement scales represent concentrations characterizing the nation and the globe as a whole.

The relationship between the four monitoring objectives and the scales of representativeness that are generally most appropriate for that objective are summarized in table MON-1:

TABLE MON-1 RELATIONSHIP AMONG MONITORING OBJECTIVES AND SCALE OF REPRESENTATIVENESS	
MONITORING OBJECTIVE	APPROPRIATE SITING SCALES
Highest Concentration	Micro, Middle, Neighborhood
Representative Concentrations	Neighborhood, Urban
Source Impact	Micro, Middle, Neighborhood
Background	Neighborhood, Urban, Regional
Regional Transport*	Urban, Regional
Welfare Impacts*	Urban, Regional

*Objectives added in 1997

The final regulatory requirement concerns the number of monitors in a network. The ambient monitoring networks operated by State and local agencies are referred to as SLAMS (State and Local Air Monitoring Station) networks. A subset of the SLAMS sites are also designated as National Air Monitoring Stations (NAMS). NAMS sites are selected to provide data for national policy analyses and trends and for reporting to the public on air quality in major metropolitan areas. NAMS sites are selected with an emphasis given to urban and multi source areas. Areas required to have designated NAMS sites are selected based on urbanized population and pollutant concentration levels. Generally, a larger number of NAMS sites are needed in more polluted and urban and multi source areas. The primary objective for siting NAMS is to monitor in the areas where the pollutant concentration and the population exposure are expected to be the highest.

While our regulations do require a minimum number of NAMS sites in certain urban areas, our regulations contain no criteria for determining the total number of stations in SLAMS networks. The optimum size of a particular SLAMS network involves trade offs among data needs and available resources that we believe can best be resolved during the network design process.

The last type of monitoring site is referred to as a Special Purpose Monitor (SPM) site. SPMs are monitoring sites which may or may not meet all of our requirements. State and local agencies generally designate monitors as SPMs when conducting special studies or when agencies are trying to determine the evaluate the representativeness new monitoring locations. They can also be sited temporarily to study a source's compliance or gather data for permitting or modeling purposes. Generally, we do not consider SPM locations when evaluating whether or not an ambient network meets our regulation since by their nature they are considered short term monitoring sites; however, data collected at SPM sites which meet all of our siting and quality assurance regulations are valid for use in regulatory actions, including validating modeling, with some exceptions.³² In the case of the PPA, many of the SPM sites operated by the MCESD in 1995 have since been designated as SLAMS. See Table MON-2.

1995 Monitoring Network

As we noted before, we are discussing the adequacy of the Phoenix area monitoring network in this TSD to support our finding that the MAG plan appropriately evaluates the PM-10 problem in the Phoenix area. Reliable ambient data is necessary to validate the base year air quality modeling. The base year for the MAG plan is 1995; therefore, we have evaluated the Phoenix area monitoring network (including SPM sites) as of 1995.

³² See the *memorandum*, John S. Seitz, Director, Office of Air Quality Planning and Standards to Regional Air Directors, "Agency Policy on the Use of Special Purpose Monitoring Data," August 22, 1997.

In 1995, there were 16 monitoring sites collecting PM-10 data in the Phoenix area, three designated as NAMS, five designated as SLAMS and eight designated as SPM. All of the sites were operated in accordance with our regulations in 1995. Figure 3-2 in the MAG plan lists the names of the sites and their locations in the Phoenix area as of April 1999.

Table MON-2 lists the PM-10 monitoring sites in the Phoenix area and their associated monitoring objective and spatial scale.

TABLE MON-2 PM-10 MONITORING SITE IN THE PHOENIX AREA				
MONITORING SITE	OPERATING AGENCY	SITE DESIGNATION 1995/2000	MONITORING OBJECTIVE	SPATIAL SCALE
West Phoenix	MCESD	NAMS/NAMS	Population Exposure	Neighborhood
South Scottsdale	MCESD	NAMS/NAMS	Population Exposure	Neighborhood
Chandler	MCESD	NAMS/NAMS	Population Exposure	Neighborhood
Glendale	MCESD	SLAMS/NAMS	Population Exposure	Neighborhood
North Phoenix	MCESD	SLAMS/SLAMS	Population Exposure	Neighborhood
Mesa	MCESD	SLAMS/SLAMS	Population Exposure	Neighborhood
South Phoenix	MCESD	SLAMS/NAMS	Population Exposure	Neighborhood
Central Phoenix	MCESD	SLAMS/NAMS	Population Exposure	Neighborhood
Maryvale	MCESD	SPM/SLAMS	Population Exposure	Neighborhood
Gilbert	MCESD	SPM/SLAMS	Population Exposure	Neighborhood
West Chandler	MCESD	SPM/SLAMS	High Concentration	Neighborhood
Greenwood	MCESD	SPM/SLAMS	Population Exposure	Neighborhood
Durango Complex*	MCESD	---/SLAMS	Maximum Concentration	Middle
Higley	MCESD	SPM/SPM	Max. Concentration/ Population Exposure	Neighborhood
Salt River Service Center	MCESD	SPM/SPM	Max. Concentration/ Source Impact	Middle
Surprise*	MCESD	---/SPM	Population Exposure	Neighborhood
Goodyear/Estrella Park*	ADEQ	---/SPM	Regional Transport	Urban

TABLE MON-2 PM-10 MONITORING SITE IN THE PHOENIX AREA				
MONITORING SITE	OPERATING AGENCY	SITE DESIGNATION 1995/2000	MONITORING OBJECTIVE	SPATIAL SCALE
ASU West*	ADEQ	---/SPM	Population Exposure	Neighborhood
Phoenix/ Supersite	ADEQ	SPM/SPM	Population Exposure	Neighborhood
Tempe*	ADEQ	---/SPM	Population Exposure	Neighborhood
Palo Verde	ADEQ	SPM/SPM	Background	Regional

*Site not part of network in 1995.

Table MON-2 also shows how the 1995 PM-10 monitoring network in the Phoenix area met all four of the required monitoring objectives, including monitoring for general background concentrations. The purpose of a general background monitoring site is to establish what the ambient PM-10 levels are in an area in the absence of any anthropogenic or man-made sources.

Most of the PM-10 monitoring sites in the Phoenix area were and are sited as neighborhood scale with an objective of assessing population exposure. Given the nature of the emission sources in the Phoenix area, which are mostly local fugitive dust sources, we believe this is an appropriate focus of the network.

It is important to understand that when an agency designs a monitoring network it is not feasible to monitor at every location that may have elevated levels of a particular pollutant. One of the goals in designing monitoring networks is to choose sites which are representative of similar areas. The PM-10 monitoring network in the Phoenix area has sites which represent PM-10 concentrations in the urban core, older, existing neighborhoods, industrial areas, and developing suburban areas. For example, while there are many stationary sources located throughout the Phoenix area there is only one site at this time which assesses stationary source impacts, the Salt River Service Center site. This site is located in an area adjacent to the Salt River Basin which contains a high concentration of PM-10 stationary sources. We believe the Salt River Service Center site adequately monitors PM-10 levels that are representative of these stationary source categories. That being said, the County is attempting to locate additional monitoring sites with the same objective of assessing contribution from specific sources or source categories. Two areas being evaluated are industrial zones on the east and west sides of the Phoenix metropolitan area.

The 24-hour attainment demonstration in the MAG plan relies, in part, on showing attainment at four specific monitoring sites. These sites were appropriately chosen as representative of the type of sources thought to be contributing to high 24-hour levels of PM-10:

Salt River for its proximity to industrial sources; West Chandler for its nearby highway construction, Maryvale for its residential area coupled with land disturbing activities due to the construction of a park; and Gilbert for its proximity to agricultural land. In 1995 these sites recorded the highest and most frequent exceedances of the 24-hour PM-10 standard. As discussed in the previous paragraph, they are also representative of similar areas in the Phoenix area that may not have monitoring sites.

MCESD and ADEQ continue to improve the PM-10 monitoring network in the Phoenix area. As shown in Table MON-2, the PM-10 network grew to 21 monitoring sites in 2000, six designated as NAMS sites, seven designated as SLAMS sites, and eight designated as SPM sites. Five of the SPM sites are operated by ADEQ. More importantly, the MCESD and the State continually reassess the adequacy of the network and its representativeness and the network continues to expand to include developing areas at the urban fringe. The 2000 network also includes a site located to assess regional transport, one of the monitoring objectives added to our regulations in 1997. Regarding the other new objective, ADEQ does monitor for welfare impacts, which for PM-10 are principally visibility, through its urban haze monitoring program. In the Phoenix area, ADEQ monitors for visibility at two point locations and operates a transmissometer. See ADEQ, Annual Report 2000, Appendix 1, Air Quality Report, p. 54.

The increase in the number of sites designated as NAMS in 2000 compared to 1995 is because EPA regulations base the required number of NAMS sites on population and severity of PM-10 concentrations (See 40 CFR 58, Appendix D, section 3.7.1. Based on the average PM-10 concentrations in the Phoenix area during the years 1998 - 2000, EPA regulations require a minimum of six sites be designated as NAMS. MCESD has met this requirement by designating six sites as NAMS.

Based on our evaluation, we find that the monitoring network operated by the MCESD and ADEQ in 1995 was adequate to support the technical evaluation of 24-hour PM-10 nonattainment problem in the Phoenix area. The network utilizes EPA reference or equivalent method monitors. Both agencies have EPA-approved quality assurance plans in place.

This section prepared by Bob Pallarino

BACT FOR MAJOR STATIONARY SOURCES OF PM-10 PRECURSORS

Requirement: CAA section 189(e): BACT must be applied to major stationary sources of PM-10 precursors if these sources contribute significantly to PM-10 exceedances in the area.

Proposed Action: Approve

Primary Guidance Documents: *General Preamble*, pp. 13539-13540 and 13541-15343
Addendum, p. 42011 and p. 42014

Primary Plan Cites: MAG Plan, p. 3-6
MAG TSD, p. III-41

What are the statutory and policy requirements?

Under CAA section 189(e), a State must also apply the control requirements applicable to major stationary sources of PM-10 to major stationary sources of PM-10 precursors, unless we determine such sources do not contribute significantly to PM-10 levels in excess of the NAAQS in the area. For the serious area plan, a "major source of PM-10 precursors" is one that emits or has the potential to emit over 70 english tons per year of SO_x, NO_x, or ammonium.

"Significantly" is not defined in either the Act or in the *General Preamble*. Rather the determination is to be made on a case-by-case basis. 57 FR at 13539. In the *Addendum*, we have suggested as a starting point in our review of whether major stationary sources of PM-10 precursors significantly contribute to PM-10 levels in excess of the standard. The suggested but not fixed criterion for the 24-hour standard is that a significant source is one that contributes 5 µg/m³ to 24-hour levels at a location exceeding the standard. *Addendum* at 42011.

How are these requirements addressed in the plan?

The MAG plan does not include controls on major sources of PM-10 precursors.

The MAG plan does not directly provide information on the impact of major precursor sources on PM-10 levels in the area; however, it does provide sufficient information on the contribution of total secondary particulate to PM-10 levels and the inventory of major sources for us to estimate that impact and to determine its significance.

Ambient data collected in 1995 at the Phoenix Supersite shows that nitrates contribute on an annual basis 1.27 µg/m³ to PM-10 levels, with a maximum daily 24-hour value of 5.3 µg/m³.

MAG TSD, p. III-40. During wintertime, these values increase as temperature and humidity conditions (cool and wet) support formation of secondary particulate. The average wintertime 24-hour levels (9/25-1/22) range from $2.9 \mu\text{g}/\text{m}^3$ to $4.4 \mu\text{g}/\text{m}^3$ depending on the site (all figures are 1989/90). MAG TSD, p. III-41.

Inventory information for 1995 show that there were nine sources with NO_x emissions over 70 tpy with total NO_x emissions of 4,486.4 mtpy. 1994 Regional PM-10 Inventory, Table B3-1. Total annual NO_x emissions in 1995 were 102,163.8 mt with the bulk of that coming from on-road motor vehicles (56 percent) and nonroad engines (33.6 percent). 1994 Regional PM-10 Inventory, Table 2-2. Major stationary sources account for just 4.4 percent of the NO_x inventory.

Ambient data collected in 1995 at the Phoenix Supersite shows that sulfates contribute on an annual basis $1.88 \mu\text{g}/\text{m}^3$ to PM-10 levels, with a maximum 24-hour value of $3.99 \mu\text{g}/\text{m}^3$. MAG TSD, p. III-40. The average wintertime levels (9/25-1/22) range from $1.1 \mu\text{g}/\text{m}^3$ to $1.4 \mu\text{g}/\text{m}^3$ depending on the site (all figures are 1989/90). MAG TSD, p. III-41. However, unlike nitrates, sulfates level are highest during the summer.

Inventory information for 1995 show that there was one source with SO_x emissions over 70 mtpd year with total SO_x emissions of 391.1 mtpy. 1994 Regional PM-10 Inventory, Table B3-1. Total annual SO_x emissions in 1995 were 4032.3 mtpd with the bulk of that coming from nonroad engines (69.3 percent). 1994 Regional PM-10 Inventory, Table 2-2. Major stationary sources account for just 9.7 percent of the SO_x inventory.

Ambient data collected in 1995 at the Phoenix Supersite shows that ammonia contributes on an annual basis $0.64 \mu\text{g}/\text{m}^3$ to PM-10 levels. with a maximum 24-hour value of $1.95 \mu\text{g}/\text{m}^3$. MAG TSD, p. III-40. The average wintertime levels of ammonium sulfate and ammonium nitrate combined (9/25-1/22) range from $5.4 \mu\text{g}/\text{m}^3$ to $7.3 \mu\text{g}/\text{m}^3$ depending on the site (all figures are 1989/90). MAG TSD, p. III-41. Like nitrates, ammonium levels tend to be highest during the winter.

Inventory information for 1995 show that there are no major stationary sources of ammonia. 1994 Regional PM-10 Inventory, Table B3-1. Essentially, all ammonia in the inventory, 99.9 percent, comes from livestock. 1994 Regional PM-10 Inventory, Table 2-2.

Does the plan meet the statutory and policy requirements?

As shown in Table PRE-1, major stationary sources contribute at most $0.61 \mu\text{g}/\text{m}^3$ to 24-hour PM-10 levels in the Phoenix area. This contribution was calculated by assuming that the major stationary sources' contribution to secondary levels is proportional to their presence in the inventory. We believe that this assumption is reasonable given the very small presence of major stationary sources in the precursor inventory and the small contribution total secondaries make to PM-10 levels in Phoenix. Moreover, secondary particulate takes hours to form from its

precursors, by which time the precursors are well mixed in the ambient air, so localized, disproportionate impacts by major sources of PM-10 precursors are very unlikely.

This contribution is well below our proposed $5 \mu\text{g}/\text{m}^3$ significance level.³³ However, independent of this fact, we believe that so small a contribution—less than 0.4 percent of the 24-hour PM-10 standard of $150 \mu\text{g}/\text{m}^3$ --is truly insignificant by any measure for the Phoenix area. PM-10 levels above the 24-hour standard in Phoenix are almost exclusively caused by a few large source categories of fugitive dust, and it is controls on these sources that are the key to expeditious attainment and not controls on trivial contributors such as major stationary sources of PM-10 precursors.

Based on their negligible impact on ambient PM-10 levels, we propose to determine that major sources of PM-10 precursors do not contribute significantly to PM-10 levels which exceed the 24-hour standard in the Phoenix area and therefore, pursuant to CAA section 189(e), BACT need not be applied to major sources of PM-10 precursors.

³³ The MAG plan demonstrates that the $5 \mu\text{g}/\text{m}^3$ is the appropriate level for determining which categories are significant in the BACM analysis; therefore, we believe that it is an appropriate level for us to adopt here. We note that the analyses of 24-hour exceedances in the Phoenix area as presented in the Microscale plan and the MAG plan clearly demonstrate that fugitive dust sources are, by far, the dominate contributors to 24-hour violations. These analyses add additional support to our proposed finding that major stationary sources of PM-10 precursor do not contribute significantly to 24-hour PM-10 levels above the standard in the Phoenix area.

TABLE PRE-1 CONTRIBUTION OF MAJOR SOURCES TO SECONDARY PARTICULATE LEVELS					
SECONDARY POLLUTANT	MAXIMUM DAILY IMPACT IN 1995 (UG/M³)	NUMBER OF MAJOR SOURCES IN 1995	TOTAL EMISSIONS FROM MAJOR SOURCES IN 1995	EMISSIONS FROM MAJOR SOURCES AS PERCENT OF INVENTORY	CALCULATED IMPACT OF MAJOR SOURCES (UG/M³)
NO _x	5.3	9	4486	4.4	0.23
SO _x	3.99	1	391	9.7	0.38
NH ₄	1.95	0	0	0	0
Total	9.17 *	10	4877	4.4	0.61

* Because peak 24-hour impacts occurred on different days, NO_x and NH₄ on January 3 and SO_x on August 31, simply summing the concentrations would not have resulted in the peak daily concentration. The 9.17 µg/m³ value is the peak 24-hour concentration of all secondaries recorded in 1995. See MAG TSD, p. III-40.

This section prepared by Frances Wicher

BACT FOR SIGNIFICANT STATIONARY SOURCES OF PM-10

Requirement: CAA section 189(b)(1)(B): BACT must be applied to significant sources of PM-10

Proposed Action: Approve

Primary Guidance Documents: *Addendum*, p. 42009 and p. 42014

Primary Plan Cites: Letter, Albert F. Brown, Director, MCESD, to Jacqueline E. Schafer, ADEQ, March 31, 2000.

What are the statutory, regulatory and policy requirements?

Under CAA section 189(b)(1)(B), a state must apply BACM to all significant source categories and BACT to significant stationary sources of PM-10. *Addendum* at 42009.

BACT is to be determined on a case-by-case basis using analytical methodology established in the reviewing authorities current PSD program. *Addendum* at 42014.

How are these requirements addressed in the plan?

We have reviewed the MAG plan to evaluate if BACT has been placed on major stationary sources of directly-emitted PM-10. A major source of PM-10 in a serious nonattainment area is any stationary source that emits or has the potential to emit over 70 english tons per day of PM-10. See CAA section 189(b)(3). Based on the 1994 Regional PM-10 Inventory, there were 3 major sources of PM-10. Appendix B3, Table B3-1. These facilities and their current control status are listed Table BACT-1

Does the plan meet the statutory and policy requirements?

We propose to find that all major sources of PM-10 have enforceable BACT limits in place.

TABLE BACT-1 CONTROL STATUS OF STATIONARY SOURCES THAT WERE MAJOR FOR PM-10 IN 1994	
SOURCE	STATUS
APS West Phoenix Power Plant	Source modified its cooling tower drift eliminator in 1997. The plant's fuel is natural gas with fuel oil backup. Additional restrictions limiting the sulfur content of the fuel oil to 0.05% and developing corresponding PM-10 emissions limits for each fuel have been incorporated into its permit, will be issued by September 2001.
M.E. West (formerly Capitol Casting, Inc.)	Source became a synthetic minor with emissions less than 70 tpy by taking permit limits. Permit issued in December, 2000.
Magotteaux Castings, Chandler	Facility closed.

Source: Brown Letter, March 31, 2000, updated July, 2001.

This section prepared by Frances Wicher

BACM ANALYSIS – STEP 1, DEVELOP AN EMISSIONS INVENTORY

Requirement: CAA section 189(b)(1)(B): Provide for the implementation of BACM no later than June 10, 2000

Proposed Action: Approve

**Primary
Guidance
Documents:** Addendum, pp. 42010-42014

**Primary
Plan Cites:** MAG plan, Appendix B, Exhibit 5, Chapter 3.0 and Appendix A.

Other Cites: Desert Research Institute, “The 1989-90 Phoenix PM-10 Study”, April 1991
ADEQ, “Plan for Attainment of the 24-hour PM-10 Standard, Maricopa County PM-10 Nonattainment Area,” May 1997

What are the statutory, regulatory and policy requirements?

CAA section 189(b)(1)(B) requires that a serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. Addendum at 42011.

Step 1 in the BACM analysis is to develop a detailed emissions inventory of PM-10 sources and source categories that can be used in the second step of the BACM analysis, modeling to determine the impact of the various sources and source categories on ambient air quality. Addendum at 42012.

How are these requirements addressed in the plan?

The MAG plan does not separately perform the first three steps of the BACM analyses for the 24-hour standard and the annual standard.

The MAG plan relies on results from three modeling studies to identify significant source categories. One of these studies evaluated significant sources using chemical mass balance (CMB) modeling performed on monitoring samples collected at 6 sites in 1989-1990. The two other studies evaluated significant sources using dispersion modeling of sources around 7

monitoring sites. We discuss these studies in more detail in our discussion of step 2 of the BACM analysis.

In CMB modeling, the primary “emissions” data are source profiles. Source profiles are essentially the chemical signature of a source, that is percentage of each chemical species present in a source’s emissions. These source profiles do not include information on the rate at which sources emit.

Desert Research Institute (DRI) performed the CMB modeling. See DRI, “The 1989-90 Phoenix PM-10 Study”, April 1991. DRI relied primarily on source profiles derived from samples taken in the Phoenix area during the same period that monitoring data analyzed in the CMB modeling was being gathered. See DRI study, p. 4-2.

Sierra Research performed the first set of dispersion modeling. See, Sierra Research, “Particulate Control Measure Feasibility Study,” January 24, 1997. It used EPA’s AP-42 emission factors combined with local information on dust loadings and silt content to calculate emission rates for the modeling. See Sierra Research study, Appendix A.

ADEQ performed the second set of dispersion modeling. See, ADEQ, “Plan for Attainment of the 24-hour PM-10 Standard, Maricopa County PM-10 Nonattainment Area,” May 1997 (“Microscale plan”). ADEQ did field surveys and used aerial photographs of each of the four monitoring sites to determine which sources needed to be inventoried and the size of each source. It also reviewed Maricopa County permit records for earthmoving operations at the Salt River site. ADEQ used emission equations developed for previous PM-10 inventories for the Maricopa County Area, and EPA emissions inventory guidance to calculate actual emissions. See Microscale plan, Chapters 4 and 6.

The MAG plan uses the base year inventory to determining that railroad, aircraft, and agricultural harvesting are insignificant sources. See Particulate Control Measure Feasibility Study, Volume I, section 3.3 and Appendix B found in Appendix B, Exhibit 5 of the MAG plan. It does, however, use the projected 2001 modeling inventory to evaluate the impact of the proposed de minimis sources. See MAG plan, pp. 9-11.

Does the plan meet the statutory and policy requirements?

Whether the MAG plan meets the section 189(b) requirement for the implementation of BACM depends on the results of the overall BACM analysis and not on the results of any one step in that analysis. We, therefore, defer the issue of compliance with the statutory requirement for BACM until we have completed our review of the complete BACM analysis in the MAG plan.

Although the plan does not separately address each PM-10 standard in this step of the BACM analysis, it does look at inventory data germane to the annual standard as well as inventory data germane to the 24-hour standard. We believe the results provide sufficient information to begin the BACM analysis for both standards. We, therefore, propose to find that the MAG plan does provide a sufficiently detailed “inventory” to use as a basis for its determination of significant sources for the 24-hour standard.

The source profiles used in the CMB modeling date from 1990 or earlier, but remain valid for the area. With the exception of motor vehicle exhaust, source profiles for wood and vegetative burning and for soil samples from construction sources, unpaved roads, desert, and agriculture are unlikely to have changed between then and now.

The motor vehicle exhaust profile, which is a composite of gasoline and diesel powered on and non road engines, may have changed somewhat given the new vehicle emission standards and fuels introduced since 1990. However, for the purposes of the BACM analysis, these changes would be important to consider only if the original CMB modeling had eliminated motor vehicle exhaust as a significant source. If so, then the MAG plan would have needed to evaluate whether revisions to the motor vehicle exhaust profile would have resulted in the source category becoming significant. The changes, however, are not important because the CMB modeling did find motor vehicle exhaust to be a significant contributor to elevated PM-10 levels and the MAG plan considers it a significant source for the purposes of the BACM analysis.

The modeling inventories in the Sierra Research study are consistent with our emission procedures and are based on worst case assumptions regarding source activity and emission rates, that is they assume the highest potential level of emissions. These assumptions are conservative because they are more likely to result in a source being considered significant than less conservative assumptions.

We have already accepted the emissions inventories underlying the Microscale plan’s determination of significant source categories. See 62 FR 31025, 31030 (June 6, 1997).

The MAG plan makes limited use of the 1994 Regional Inventory in its determination of significant source categories. Most of the evidence gathered to date on the PM-10 problem in the Phoenix area indicates that the causes of elevated 24-hour PM-10 levels are often localized; therefore, an analysis of significant sources that only looks at the regional scale is likely to miss important contributors to the 24-hour PM-10 exceedances.

This section prepared by Frances Wicher

BACM ANALYSIS – STEP 2, MODEL TO IDENTIFY SIGNIFICANT SOURCES

Requirement: CAA section 189(b)(1)(B): Provide for the implementation of BACM no later than June 10, 2000

Proposed Action: Approve

**Primary
Guidance
Documents:** *Addendum*, p. 42010-42014

**Primary
Plan Cites:** MAG plan, pp. 9-6 through 9-15
Sierra Research, “Particulate Control Measure Feasibility Study”, Volume 1, Chapter 3 and Appendix A (found in MAG plan, Appendix B, Exhibit 5) Desert Research Institute, “The 1989-90 Phoenix PM-10 Study”, April 1991

Other Cites: ADEQ, “Plan for Attainment of the 24-hour PM-10 Standard, Maricopa County PM-10 Nonattainment Area,” May 1997

What are the statutory, regulatory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Step 2 in the BACM analysis is to model to evaluate the impact on PM-10 concentrations over the standards of the various sources and source categories to determine which are significant.

We have established a presumption that a significant source category is one that contributes 5 $\mu\text{g}/\text{m}^3$ or more to PM-10 levels at a location of 24-hour violation. *Addendum* at 42011. However, whether the threshold should be lower than this in any particular area depends upon the specific facts of that area’s nonattainment problem. Specifically, in areas that are demonstrating attainment by December 31, 2001, it depends on whether requiring the application of BACM on source categories below a proposed de minimis level would meaningfully expedite attainment. In areas that are claiming the impracticability of attainment by December 31, 2001, it depends upon whether requiring the application of BACM on source categories below a proposed de minimis level would make the difference between attainment and nonattainment by the serious area deadline of December 31, 2001.

How are these requirements addressed in the plan?

In order to have sufficient lead time to evaluate and adopt control measures, MAG needed to identify potential significant source categories well before it completed the base year air quality modeling. To do this, it turned to existing studies on source impacts in the Phoenix area. These studies are:

1. Desert Research Institute, "The 1989-90 Phoenix PM-10 Study," April 1991. (DRI study).

This study applied the chemical mass balance receptor model to ambient data from three urban and non urban sites to estimate the contributions to PM-10 from motor vehicle exhaust, geological material, vegetative burning, and secondary ammonium nitrate. The three urban monitors are South Scottsdale, Central Phoenix, and West Phoenix and the three non-urban sites are Estrella park, Gunnery Range, and Pinnacle Peak.³⁴ Data was gather from September 25, 1989 to January 21, 1990.

The study identified primary geological material as the major contributor to all six sites and suggested that at the urban sites much of this was from re-entrained road dust. The study was unable to further differentiate the contributions of the various fugitive dust sources. DRI study, Vol. 2, page S-3. The study also identified three significant non-fugitive dust sources at the urban sites: motor vehicle exhaust with a least a 50% contribution from diesel vehicles (however, no distinction was made between nonroad and on-road sources), residential wood combustion, and precursor sources of secondary ammonium nitrate. DRI study, Vol. 2, page S-4.

The DRI study evaluated significance only for the 24-hour standard and only during fall and early winter.

2. Sierra Research, "Particulate Control Measure Feasibility Study," January 24, 1997. (Sierra Research Study)

This study applied dispersion modeling to evaluate source contribution at three monitors: South Phoenix, Chandler, and Salt River.³⁵ Sierra Research Study, p. 3-6.

³⁴ South Scottsdale and Central Phoenix have exceeded the 24-hour standard only once (in 1997) since the monitors were established prior to 1990. West Phoenix exceed the 24-hour standard twice in 1989 and once in 1997 but at no other time.

³⁵ South Phoenix exceeded the 24-hour standard twice in 1992, once in 1997, and once in 1999. West Chandler is a new site established in 1995. It exceeded the 24-hour standard twice in 1995 and twice in 1997 but not since. Salt River continues to exceed the 24-hour standard.

Several sources at each site were designated as potentially significant sources of PM-10 to be evaluated in the dispersion modeling. These sources were:

Chandler: agricultural tilling and construction site preparation

South Phoenix: re-entrained road dust (from track out)

Salt River: industrial paved road use and unpaved road use

Sierra Research Study, p. 3-7.

The Sierra Research study concluded that each of these sources, with the exception of re-entrained road dust, has the potential to be significant for the 24-hour or annual standard, although only two sources, industrial paved road use and unpaved road use, showed potential to exceed the $1 \mu\text{g}/\text{m}^3$ threshold for the annual standard. Sierra Research Study, p. 3-8 and Table 3-2.

The Sierra Research study did not evaluate the contribution of windblown fugitive dust nor did it evaluate construction site activities such as trenching, material delivery, and employee parking. Sierra Research Study, p. 3-8.

3. ADEQ, "Plan for Attainment of the 24-hour PM-10 Standard, Maricopa County PM-10 Nonattainment Area," May 1997. (known as the Microscale plan)

This plan evaluated 24-hour exceedances at four monitoring sites during 1995. The four sites are Salt River, West Chandler, Gilbert, and Maryvale. Except for Salt River, none of these sites have exceeded the annual standard. MAG plan, Table 3-3. Eight significant source fugitive dust source categories were identified:

West Chandler: windblown dust from agricultural fields, agricultural aprons, construction

Gilbert: windblown dust from agricultural aprons and vacant disturbed land, unpaved parking lots

Salt River: earthmoving, unpaved roads, haul roads

Maryvale: windblown dust from disturbed land (related to construction)

Based on these three studies, the MAG plan listed these eight source categories as significant (from MAG plan, Table 9-1):

1. Paved road travel
2. Unpaved road travel (includes unpaved parking lots)
3. Industrial paved road travel
4. Construction site preparation (includes disturbed vacant land)
5. Agricultural tilling (includes all agricultural activities)

6. Residential wood combustion
7. On-road and nonroad motor vehicle exhaust³⁶
8. Secondary ammonium nitrate

The following categories were determined not to be significant (MAG plan, Table 9-a):

1. Stationary point sources
2. Fuel combustion (excluding residential wood combustion)
3. Waste/open burning
4. Agricultural harvesting
5. Cattle feedlots
6. Structural/vehicle fires
7. Charbroiling/frying meat
8. Marine vessel exhaust
9. Airport ground support exhaust
10. Railroad locomotive exhaust
11. Windblown dust from fluvial channels
12. Wild fires

³⁶ We do not agree that on-road and nonroad motor vehicle exhaust constitute a single source category. Under the CAA, a nonroad vehicle is defined as not being a on-road motor vehicle and are thus not in the same category as on-road vehicles. See CAA sections 215(2) and (11). We believe that these categories should be further divided between gasoline and diesel engines: gasoline on-road, diesel on-road, gasoline nonroad, and diesel nonroad, given that controls differ by fuel type. Each of these individual categories may or may not be significant itself. The broad source category "on and nonroad motor vehicle exhaust" was identified as significant in the 1989-1991 CMB study by Desert Research Institute (DRI). At the time of the DRI study, limitations in the available data prevented distinguishing between on and non road motor vehicle emissions. See MAG, "The 1999 Brown Cloud Project for the Maricopa County Area," Draft Report, October, 1999, p. 4-9. Thus, the study could not split the very broad "engine exhaust" grouping into more appropriate source categories.

This inability to distinguish between sources with similar emission profiles is a limitation of the CMB model. This limitation is most graphically demonstrated by the fact that the model cannot distinguish between various sources of "primary geological material" which can include fugitive dust emissions from such diverse sources as paved roads, unpaved roads, construction sites, agricultural fields, and sand and gravel operations, all of which are considered distinct source categories. See Receptor Model Technical Series, Volume II: Chemical Mass Balance (EPA-450/4-81-016b, July 1981)

In its final list of significant sources, the MAG plan does not distinguish between those source categories that are significant for the 24-hour standard and those that are significant for the annual standard, but rather treats a source as significant if it is significant for either standard.

For the 24-hour standard, the MAG plan demonstrates that selected significance threshold is appropriate by showing that control on the de minimis source categories would not make the difference between attainment and nonattainment of the 24-hour standard by 2001 regional and at either the West Chandler or Gilbert sites.³⁷

West Chandler: The microscale modeling explicitly identified seven categories that contributed to the April 9, 1995 exceedance at the West Chandler site. ADEQ TSD, p. 3-12. These categories are agricultural fields, agricultural aprons, road construction, housing construction, vacant lands, (local) paved roads, and (local) unpaved roads. None of these categories are considered de minimis for the BACM analysis in the MAG plan.³⁸

Not explicitly identified in the microscale modeling were those source categories that contributed to background PM-10 levels at the site. To determine the effect of BACM controls on the source categories contributing to background levels, the background was split between wind-blown emissions and non-wind blown emissions--April 9, 1995 being a windy day. No sources contributing to the wind-blown background were assumed to be de minimis.³⁹ All de minimis sources were assumed to be in the non-wind background, in fact the non-wind background was assumed to be entirely due to emissions from de minimis sources. MAG plan, p. 9-14. This assumption grossly exaggerates the contribution of de minimis sources by leaving out any contribution to non-wind background levels by on and nonroad engines, paved and

³⁷ We have already approved the attainment demonstrations at the Salt River and Maryvale sites which did not rely on controls on de minimis source categories and therefore they do not enter into this analysis. 62 FR 41856 (August 4, 1997)

³⁸ Although three categories--housing construction, paved roads, and unpaved roads--had a less than $5 \mu\text{g}/\text{m}^3$ at the West Chandler site. However, because these categories were either significant at another microscale site or significant for the annual standard, they were considered significant for the BACM analysis.

³⁹ A good assumption because only three categories of identified de minimis sources categories have a windblown component--cattle lots, agricultural harvesting, and fluvial (river) channels. None of these sources were close enough to the West Chandler monitor to have any measurable effect on PM-10 levels at that site in 1995.

unpaved roads outside of the microscale area, construction activities outside the microscale area, and natural background levels of PM-10.⁴⁰

The MAG plan showed that BACM on the significant source categories including those in the wind-blown background would reduce the modeled exceedance at the West Chandler monitor to $314.6 \mu\text{g}/\text{m}^3$. MAG plan, p. 9-13. Total elimination of the non-wind background of $21.8 \mu\text{g}/\text{m}^3$ would reduce this level to $292.8 \mu\text{g}/\text{m}^3$, still almost double the 24-hour standard of $150 \mu\text{g}/\text{m}^3$. MAG plan, p. 9-14. Given the initial assumption that the non-wind background is entirely due to de minimis sources, eliminating the non-wind background is the equivalent of zeroing out all emissions from these de minimis sources. Even if this level of control were possible--and it is not-- controls on the de minimis sources would not make the difference between attainment and nonattainment at the West Chandler monitor by December 31, 2001.

Gilbert: The microscale modeling explicitly identified five categories that contributed to the April 9, 1995 exceedance at the Gilbert site. ADEQ TSD, p. 3-11. These categories are agricultural aprons, vacant lands, unpaved parking lots, (local) paved roads, and (local) unpaved roads. None of these categories are considered de minimis for the BACM analysis in the MAG plan.⁴¹

Not explicitly identified in the microscale modeling were those source categories that contributed to background PM-10 levels at the site. To determine the effect of BACM controls on the source categories contributing to background levels, the background was split between wind-blown emissions and non-wind blown emissions--April 9, 1995 being a windy day. No sources contributing to the wind-blown background were assumed to be de minimis. All de minimis sources were assumed to be in the non-wind background, in fact the non-wind background was assumed to be entirely due to emissions from de minimis sources. MAG plan, p. 9-15. This assumption grossly exaggerates the contribution of de minimis sources by leaving out any contribution to non-wind background levels by on and nonroad engines, paved and unpaved roads outside of the microscale area, construction activities outside the microscale area, and natural background levels of PM-10.

⁴⁰ Even in the absence of human activity, there would a measurable level of PM-10 in the ambient air. This level is called the natural background. For the MAG plan, the natural background was estimated to be from 11 and $22 \mu\text{g}/\text{m}^3$ depending on the season. MAG TSD, p. III-16.

⁴¹ Although two categories--paved roads and unpaved roads--had a less than $5 \mu\text{g}/\text{m}^3$ at the Gilbert site. However, because these categories were either significant at another microscale site or significant for the annual standard, they were considered significant for the BACM analysis.

The MAG plan showed that BACM on the significant source categories including those in the wind-blown background would reduce the modeled exceedance at the Gilbert monitor to $205.5 \mu\text{g}/\text{m}^3$. MAG plan, p. 9-15. Total elimination of the non-wind background of $21.8 \mu\text{g}/\text{m}^3$ would reduce this level to $183.7 \mu\text{g}/\text{m}^3$, still substantially above the 24-hour standard of $150 \mu\text{g}/\text{m}^3$. MAG plan, p. 9-15. Given the initial assumption that the non-wind background is entirely due to de minimis sources, eliminating the non-wind background is the equivalent of zeroing out all emissions from these de minimis sources. Even if this level of control were possible--and it is not, controls on the de minimis sources would not make the difference between attainment and nonattainment at the Gilbert monitor by December 31, 2001.

Does the plan meet the policy requirements?

Significant Source Categories

We propose to find that the MAG plan has not excluded any source categories that should be considered significant from its list of significant source categories. The plan presents acceptable modeling to evaluate the impact of various PM-10 sources and source categories on PM-10 levels and to derive a comprehensive and conservative list of significant source categories.

Two of the modeling studies, DRI and Sierra Research, do not use recent emissions inventory or ambient air quality data.⁴² We, however, do not believe this adversely affects the identification of significant source categories in the MAG plan, first because the identified significant source categories include the vast majority, 94 percent, of emissions in the 1994 base year inventory⁴³ and second because the plan does use recent inventory data, the inventory used

⁴² We also note, except in very limited instances, the monitors used in these two studies did not exceed the PM-10 standards. We define a significant source as one that contributes significantly to a location that *exceeds* the PM-10 standard. *Addendum* at 42011. Therefore, these studies can only reliably indicate which source categories contribute more than incidentally to ambient PM-10 concentrations in the Phoenix area and not which source categories are significant contributors to PM-10 exceedances. However, as we will discuss later, we do not consider this a flaw in identifying significant source categories.

⁴³ In the 1994 base year average day inventory 135.5 metric tons per day (mtpd) is in significant source categories and only 8.5 mtpd are in de minimis source categories. The total average day inventory, not including windblown emissions, is 144.1 mtpd; therefore, significant sources account for $135.5/144.1$ or 94 percent of the total inventory.

The 1994 base year inventory is an average annual day inventory and does not include windblown emissions because an average day in the Phoenix area is not windy. If windblown emissions from construction sites, other disturbed land, and agriculture--all significant

in the microscale modeling, to identify local significant contributors to 24-hour exceedances. MAG plan, p. 9-7 and ADEQ TSD, p. 3-1.

Our proposal here does not mean that we believe all the source categories identified as significant in the MAG plan need to be considered significant for the BACM requirement. We believe that the MAG plan is conservative in its selection of significant source categories, that is, it may have included more source categories in its significant source list than is strictly needed. Thus our use of negative wording in our proposed finding: no significant source categories were excluded as opposed to the only the right categories were included. In our 1998 FIP, we derived a slightly different list of significant sources. For example, we did not include consider either diesel or gasoline-powered on-road mobile sources to be significant. 63 FR 15920, 15932 (Table 2 and text).

De Minimis Source Categories

We also propose to find that the MAG plan correctly excludes certain source categories from the BACM analysis because of their de minimis impact on PM-10 levels in the Phoenix area.

In areas that are claiming the impracticability of attainment by December 31, 2001, determining whether source categories are truly de minimis depends on determining if the application of BACM-level controls on the proposed de minimis source categories would make the difference between attainment and nonattainment by the serious area deadline of December 31, 2001.

The MAG plan identifies 12 source categories as having an impact of less than $5 \mu\text{g}/\text{m}^3$ and thus, de minimis.⁴⁴ The plan shows that even if emissions from these sources were totally eliminated, the area would still not attain the 24-hour standard by the end of 2001, thus demonstrating that the $5 \mu\text{g}/\text{m}^3$ de minimis threshold is appropriate. MAG plan, p. 9-12. See

sources—are included in the inventory then the identified significant source categories would account for an even greater percentage of the overall inventory.

⁴⁴ In both the significant source category list and the de minimis source category list, some of the identified source categories are very broad. For example, the motor vehicle emissions category includes everything from heavy duty diesel trucks to forklifts, lawn mowers, and the family car. We define “source categories” for the purposes of BACM as area-wide sources or large individual stationary sources of PM-10 emissions that may be regulated under a specific rule, generic emission limitation, or standard of performance, or a specific control program in the SIP. See *Addendum*, fn. 23. Thus, for determining the implementation of BACM, these extremely broad categories, such as engine exhaust, have to be separated into their components since no one control will apply across the category.

also discussion under “other Comments” below. We, therefore, propose to find that $5 \mu\text{g}/\text{m}^3$ is the appropriate threshold for determining significant sources in the Phoenix area for the 24-hour standard and that the source categories identified as having less than this impact are de minimis and are appropriately excluded from the BACM analysis.

Other Information

Re-analysis of the De Minimis Determination

In the de minimis analysis, certain emission categories (e.g., such as vacant land, unpaved parking) were assumed to be uncontrolled at the end of 2001. These categories will in fact be subject to BACM by that time. By not including these controls, the gap between nonattainment and attainment of the 24-hour standard in 2001 is much larger than it should be and thus, the de minimis determination is suspect.

To determine if the selected de minimis categories are truly de minimis under the correct control assumptions, we redid the analysis incorporating the appropriate level of control. For our reanalysis, we assumed that control effectiveness for each source category was the same as the one used for that category in the annual standard attainment demonstration. We concluded from the reanalysis that the selected de minimis threshold is appropriate and the identified de minimis categories are indeed de minimis and are appropriately excluded from the BACM analysis.

We summarize our reanalysis below. For more detailed information, please see the section, “Demonstrating the Impracticability of Attainment by December 31, 2001.”

TABLE DEM-1 REVISED DE MINIMIS DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH ANNUAL STANDARD DEMONSTRATION WEST CHANDLER				
SOURCE	CONTROL	1995 IMPACT MG/M ³	2001	
			CONTROL	IMPACT MG/M ³
Ag fields	BMP rule	190	39.1 ¹	115.6
Ag aprons	BMP rule	24	20 ^{1, 2}	19.2
Road construction	Rule 310	73.5	77 ³	16.9
Housing construction	Rule 310	0.1	77 ³	0
Vacant lands	Rule 310.01	29.3	88.7	3.3
Paved Roads	--	0.2	0	0.2

TABLE DEM-1 REVISED DE MINIMIS DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH ANNUAL STANDARD DEMONSTRATION WEST CHANDLER				
SOURCE	CONTROL	1995 IMPACT MG/M ³	2001	
			CONTROL	IMPACT MG/M ³
Unpaved Roads	Rule 310.01	4.1	75	1
Total local impact		321.2	Zero out nonwind background as a surrogate for 100 percent control of de minimis sources	156.2
Background - wind blown		58.2		34
Background - nonwind		21.8		0
Total		401.2		190.2

Footnotes:

1. Between 1995 and 2001, 20 percent of agricultural land were lost to development; assumes 23.9 percent control to control windblown dust from a cotton field using multi-year crop, the maximum control available from BMPs for this sources. See Ag Quantification TSD, p. B-7.
2. No controls for windblown dust for this category. Control reflects loss of agricultural lands only.
3. Control effectiveness for disturbed areas on construction sites only. There was no construction activity on the modeled exceedance day.

Source: 1995 impacts, ADEQ TSD, pp. 3-10 and 3-12. Control efficiencies, see Table MOD-7 of this TSD.

TABLE DEM-1A CONTRIBUTIONS TO WINDBLOWN BACKGROUND WITH REVISED CONTROL FACTORS WEST CHANDLER, 2001			
	AGRICULTURE	CONSTRUCTION	VACANT LOTS
Land use percentage	56%	39%	5%
Wind contribution -- 9 hrs	32.6 µg/m ³	22.7 µg/m ³	2.9 µg/m ³

TABLE DEM-1A CONTRIBUTIONS TO WINDBLOWN BACKGROUND WITH REVISED CONTROL FACTORS WEST CHANDLER, 2001			
	AGRICULTURE	CONSTRUCTION	VACANT LOTS
Overall control efficiency	31.3% ¹	54.9%	53.1%
PM10 Contribution with controls	22.4 µg/m ³	10.2 µg/m ³	1.4 µg/m ³
total windblown background = 34.0 µg/m ³			

Footnote: 1. 39.1 percent control from microscale component with a 80 percent rule effectiveness factor.

Source: Land use percentages and wind contributions - 9 hrs, ADEQ TSD, p. A-8. Overall control efficiencies, see Table MOD-7 of this TSD.

As can be seen from Table DEM-2 below, under our reanalysis, Gilbert would demonstrate attainment by December 31, 2001 without controls on the de minimis sources.

TABLE DEM-2 REVISED DE MINIMIS ATTAINMENT DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH ANNUAL STANDARD DEMONSTRATION GILBERT				
SOURCE	CONTROL MEASURE	1995 IMPACT MG/M ³	2001	
			CONTROL %	IMPACT MG/M ³
Ag aprons	BMP rule	55	20 ^{1, 2}	44
Unpaved parking lots	Rule 310	67.2	75	16.8
Vacant lands	Rule 310.01	13.5	88.7	1.5
Paved Roads	--	1.5	0	1.5
Unpaved Roads	Rule 310.01	3.5	75	0.9
Total local impact		140.7	Zero out nonwind background as a surrogate for 100 percent control of de minimis sources	64.7
Background - wind blown		68.2		39.7
Background - nonwind		21.8		0
Total		230.7		104.4

Footnotes:

1. Between 1995 and 2001, 20 percent of agricultural land were lost to development.
2. No controls for windblown dust for this category. Control reflects loss of agricultural lands only.

Source: 1995 impacts, ADEQ TSD, pp. 3-11 and 3-13. Control efficiencies, see Table MOD-7 of this TSD.

TABLE DEM-2A CONTRIBUTIONS TO WINDBLOWN BACKGROUND WITH REVISED CONTROL FACTORS GILBERT, 2001			
	AGRICULTURE	CONSTRUCTION	VACANT LOTS
Land use percentage	55%	41%	4%
Wind contribution 9 hrs	37.5 $\mu\text{g}/\text{m}^3$	28.0 $\mu\text{g}/\text{m}^3$	2.7 $\mu\text{g}/\text{m}^3$
Overall control efficiency	31.3%	54.9%	53.1%
PM10 Contribution with controls	25.8 $\mu\text{g}/\text{m}^3$	12.6 $\mu\text{g}/\text{m}^3$	1.3 $\mu\text{g}/\text{m}^3$
total windblown background = 39.7 $\mu\text{g}/\text{m}^3$			

Source: Land use percentages and wind contributions - 7 hrs, ADEQ TSD, p. A-7. Overall control efficiencies, see Table MOD-7 of this TSD.

Potential Controls on De Minimis Categories

The proposed de minimis source categories generally fall into one of two types: those that are already subject to control and those that are uncontrollable either by their nature or because the State is pre-empted from controlling them. Only a few of the categories are controllable but are not currently controlled. See Table DEM-3. As a result, there is little in additional emission reductions that could be realized by applying controls to the identified de minimis sources.

TABLE DEM-3 CONTROLS OPTIONS FOR DE MINIMIS SOURCE CATEGORIES		
SOURCE CATEGORY	2001 PM-10 EMISSIONS (MTPD)	EXISTING CONTROLS OR CONTROL OPTION
ALREADY CONTROLLED		
Point sources	3.07	This category includes major sources which will be controlled by BACT. Other types of sources include concrete products, sand and gravel operations, and asphaltic concrete manufacturing which are subject to MCESD Rule 316 and cotton gins which are subject to MCESD Rule 319.

TABLE DEM-3 CONTROLS OPTIONS FOR DE MINIMIS SOURCE CATEGORIES		
SOURCE CATEGORY	2001 PM-10 EMISSIONS (MTPD)	EXISTING CONTROLS OR CONTROL OPTION
Fuel combustion (excluding residential wood combustion)	0.66	98% of emissions from this category are from the combustion of natural gas in residential, commercial, and industrial settings (water heaters, stoves, ovens, boilers). 1994 Regional PM-10 Inventory, pp. 4-9 to 4-12. Short of requiring conversion to electricity, natural gas is the cleanest fuel for these types of sources.
Waste/open burning	0.08	Already subject to MCESD Rule 314.
Agricultural harvesting	0.0007	Already subject to control as part of the BMP rule.
Cattle feedlots	0.31	Already covered by MCESD Rule 310.01.
Charbroiling/frying meat	0.74	Source will be controlled in part by MCESD rule. See Revised Measure 23 in MCESD 1999 commitments. This emissions inventory category also includes charbroiling/frying meat at home.
Marine vessel exhaust	0.03	These engines are covered by national emission standards which control VOC and NOX emissions. PM-10 emissions are not directly regulated.
Railroad locomotive exhaust	0.87	States are pre-empted from controlling this source for emission reduction purposes. See section 209(e)(1)(B). We have issued national locomotive engine standards. See 40 CFR §92.7.
UNCONTROLLABLE SOURCES		
Structural/vehicle fires	0.26	Uncontrollable source
Wild fires	0.06	Uncontrollable source.
POTENTIALLY CONTROLLABLE SOURCES		
Airport ground support equipment exhaust	0.79	Unregulated source. Some airlines are switching voluntarily to electric vehicles.
Windblown dust from fluvial channels	3.45	These are riverbed channels and are a natural source.

Source: MAG plan, Table 9-a.

We also checked the list of significant and de minimis source categories against the emissions inventory to assure that no source categories were not evaluated for significance. We found that none were. See Table DEM-4.

TABLE DEM-4 EMISSIONS INVENTORY CATEGORIES AND THEIR CORRESPONDING SIGNIFICANCE CATEGORY	
EMISSIONS INVENTORY	INCLUDES THESE SIGNIFICANT/DE MINIMIS SOURCE CATEGORY
Industrial processes External combustion Internal combustion Other stationary point sources	Precursor sources of secondary ammonium nitrate (i.e., ammonia sources) Haul roads <i>Point sources</i>
Fuel Combustion residential natural gas commercial/industrial natural gas industrial natural gas industrial fuel oil	<i>Fuel combustion (not including residential wood burning)</i>
Process fugitives	<i>Point sources</i> Haul roads
Waste/open burning	<i>Open burning</i>
Agricultural tilling	Agricultural tilling
Agricultural harvesting	<i>Agricultural harvesting</i>
Cattle feedlots	<i>Cattle feedlots</i>
Livestock	Precursor sources of secondary ammonium nitrate (i.e., ammonia sources)
Structural/vehicle fires	<i>Structural/vehicle fires</i>
Charbroiling/frying meat	<i>Charbroiling/frying meat</i>
Lawn and garden equipment exhaust Industrial/commercial equipment exhaust Agricultural equipment exhaust Recreational vehicle exhaust Marine vessel exhaust	On and off road motor vehicle exhaust
Airport ground support exhaust	<i>Airport ground support equipment exhaust</i>
Railroad locomotive exhaust	<i>Railroad locomotive exhaust</i>
Aircraft engine exhaust	No emissions estimated
Construction activity fugitive dust Entrained from construction track out	Construction
Paved road dust	Paved roads

TABLE DEM-4 EMISSIONS INVENTORY CATEGORIES AND THEIR CORRESPONDING SIGNIFICANCE CATEGORY	
EMISSIONS INVENTORY	INCLUDES THESE SIGNIFICANT/<i>DE MINIMIS</i> SOURCE CATEGORY
Unpaved road dust	Unpaved roads
LDGV exhaust LDGT exhaust HDGV exhaust LDDV exhaust LDDT exhaust HDDT exhaust Motorcycle exhaust	On and off road motor vehicle exhaust
Wild fires	<i>Wild fires</i>
Construction windblown	Construction
Agricultural windblown	Agriculture
Fluvial channels	<i>Fluvial channels</i>
Disturbed vacant land (in windblown inventory only)	Vacant disturbed areas

This section prepared by Frances Wicher

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR ON-ROAD MOTOR VEHICLE EXHAUST (TECHNOLOGY STANDARDS AND FUELS)

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10. sources.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source categories including their technological feasibility, costs, and energy and environmental impacts, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State “demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area.” CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area, compare potential most stringent measures for the significant source category against the existing BACM or other measures, if any, for that source category,

and provide for the adoption of those measures that are found to be more stringent and provide for their implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies on-road vehicle exhaust as a significant source of PM-10 in the Phoenix area. MAG plan, p. Table 9-1.

Description of On-road Motor Vehicle Exhaust Source Category

This category includes tailpipe and tire wear emissions of primary PM-10 from on-road motor vehicles. On-road motor vehicles include both gasoline and diesel-powered passenger cars, light, medium, and heavy duty trucks, buses, and motorcycles.

PM-10 Emissions from On-road Motor Vehicle Exhaust in the Phoenix Area

The MAG plan includes motor vehicle exhaust emissions from all types of on-road vehicles in the Phoenix area. See MAG plan, Appendix A, Exhibit 6 (1994 Regional PM-10 Emissions Inventory), Chapter 6, summarized in Table ORM-1. On-road motor vehicle exhaust accounts for 3.3 percent of the total directly-emitted, non-windblown 1994 PM-10 inventory (1994 Regional Inventory, Table 2-3) and 1.2 percent of the 2006 pre-control PM-10 inventory (MAG plan TSD, Table II-3). Total on-road vehicle exhaust PM-10 drop by a third from 1995 to 2006 due primarily to fleet turnover to cleaner vehicles and new fuel standards. (MAG plan TSD, Tables II-1 and II-3). The microscale analysis, however, does not identify on-road motor vehicle exhaust as an explicit contributor to 24-hour exceedances. Microscale plan, p. 17-19.

TABLE ORM-1 1994 EMISSIONS FROM ON-ROAD MOTOR VEHICLE EXHAUST & TIRE WEAR IN THE PHOENIX PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER DAY	
	GASOLINE	DIESEL
Light duty vehicles (e.g., cars)	0.44	0.05
Light duty trucks	0.31	0.12
Heavy duty trucks	0.26	3.62

TABLE ORM-1 1994 EMISSIONS FROM ON-ROAD MOTOR VEHICLE EXHAUST & TIRE WEAR IN THE PHOENIX PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER DAY	
	GASOLINE	DIESEL
Motorcycles	0.01	0
Totals	1.02	3.8

Source: 1994 Regional PM-10 Inventory, Table 6-9

Existing Controls

1. National controls

We have adopted national emission standards for on-road motor vehicle exhaust. These standards apply to motor vehicles sold in Arizona. See Table ORM-2. We have also recently adopted Tier II standards for motor vehicles including sports utility vehicles. 65 FR 6797 (February 10, 2000). We also have national controls on fuels sold throughout the county which affect emissions of motor vehicles in Arizona.

The 1990 standards for on-road diesel fuel limited sulfur levels to a maximum of 500 ppm and set a minimum centane index of 40 (max aromatics of 35%). 40 CFR 80.29. In January 2001, we established a new diesel fuel sulfur limit of 15 ppm as part of our overall program to control emissions from heavy duty diesel vehicles. The new limit will be fully in place by September, 2006. 66 FR 5002 (January 8, 2001).

In February 2000, we also established sulfur limits for gasoline. Starting in 2004, refiners and importers must meet a corporate average gasoline sulfur level of 120 ppm with a cap of 300 ppm.. By 2006, the cap will be reduced to 80 ppm and most refineries must produce gasoline averaging no more than 30 ppm sulfur. 65 FR 6697 (February 10, 2000). Because sulfur in gasoline reduces the effectiveness of catalytic converters, these lower sulfur limits will aid in meeting the new Tier 2 motor vehicle emissions standards. These sulfur limits will apply in the Phoenix area and will operate in addition to the State's cleaner burning gasoline program.⁴⁵

⁴⁵Arizona's CBG program is state program established by state law; as such it operates along side but not in place of EPA's fuel regulations applicable to areas not in the federal reformulated gasoline program.

TABLE ORM-2 SUMMARY OF ESTABLISHED EPA ON-ROAD MOTOR VEHICLE STANDARDS BY SOURCE CATEGORY IN MAG PLAN		
MAG PLAN EMISSION CATEGORY	EPA STANDARDS APPLICABLE TO CATEGORY (PM)	COMMENT
Light duty vehicles - gasoline	Tier 0 - none; Tier 1- 0.08 g/mile at 50K miles and 0.10 g/mile at 100K miles; Tier 2; 0.01-0.02 g/mile, full useful life	Tier 2 standards will be effective with model year 2004.
Light duty vehicles - diesel	Tier 0 - 0.20 g/mile at 50K miles; Tier 1- 0.08 g/mile at 50K miles and 0.10 g/mile at 100K miles; Tier 2; 0.01-0.02 g/mile, full useful life	Tier 2 standards will be effective with model year 2004.
Light duty trucks - gasoline	Tier 0 - none; Tier 1 - 0.08/0.10 g/mile; Tier 2; 0.01-0.02 g/mile, full useful life	Tier 2 standards will be effective with model year 2004.
Light duty trucks - diesel	Tier 0 LDT1 - 0.26 g/mile at 100K miles, Tier 0 LDT2 - 0.13 g/mile at 100K miles; Tier 1 - 0.08/0.10 g/mile; Tier 2; 0.01-0.02 g/mile, full useful life	Tier 2 standards will be effective with model year 2004.
Medium and Heavy duty trucks - gasoline	Medium duty: interim, 0.06-0.08 g/mi; final, 0.01-0.02 g/mile, full useful life None Heavy: 0.01 g/bhp-hr	Interim standards will be effective with model year 2004, final with model year 2008. Standard will be effective with model year 2008.
Medium and Heavy duty trucks - diesel	1994+ - 0.10 g/bhp-hr; 2007+ -0.01 g/bhp-hr	
Urban Buses	1994&1995 - 0.07 g/bhp-hr 1996+ - 0.05 g/bhp-hr	

TABLE ORM-2 SUMMARY OF ESTABLISHED EPA ON-ROAD MOTOR VEHICLE STANDARDS BY SOURCE CATEGORY IN MAG PLAN		
MAG PLAN EMISSION CATEGORY	EPA STANDARDS APPLICABLE TO CATEGORY (PM)	COMMENT
Motorcycles	None	

2. State and local controls

Arizona has adopted a number of programs to reduce emissions from on-road motor vehicles. In most instances, these programs have focused on reducing carbon monoxide and VOCs and not PM-10. Table ORM-3 lists a number of the technology-based programs. Programs aimed at reducing vehicle usage or improving traffic flow are addressed later.

TABLE ORM-3 SUMMARY OF ARIZONA PROGRAMS AFFECTING ON-ROAD MOTOR VEHICLE EMISSIONS	
PROGRAM TYPE	STATE PROGRAM
Light Duty Vehicles and Trucks	
Inspection and maintenance	A comprehensive enhanced I/M program requiring 1981 and newer vehicles to undergo a I/M-240 like test including a pressure test, increase repair limits, and a road side testing program. MAG plan, pp. 4-4 to 4-6. See also 2001 I/M SIP submittal. ⁴⁶
Fuel standards	The Cleaner Burning gasoline program requires either federal Phase II RFG or CA Phase II RFG during the summer at an RVP of 7.00 psi and CA Phase II RFG during winter at a RVP of 9 psi. MAG plan, pp. 7-16 to 7-17.

⁴⁶ADEQ, Final Arizona State Implementation Plan Revision, Basic and Enhanced Vehicle Emissions Inspection/Maintenance Program, June 2001.

TABLE ORM-3 SUMMARY OF ARIZONA PROGRAMS AFFECTING ON-ROAD MOTOR VEHICLE EMISSIONS	
PROGRAM TYPE	STATE PROGRAM
Alternatively-fueled vehicles	Personal and corporate tax credits for purchase or conversion of vehicles to alternative fuels. Mandated conversion of 75 percent of state, local, and federal fleets to alternative fuels. MAG plan, pp. 4-6 to 48.
Buses	
Conversion programs	Mandated conversion of 75 percent of school district buses. New transit buses must be alternative fuels. MAG plan, pp. 4-6 to 4-5.
Heavy Duty Diesel Trucks	
Inspection and maintenance	Snap Idle test. MAG plan, p. 4-4. Implemented in April 2000. 2001 I/M SIP submittal, p. 5.

Does the plan meet the statutory and policy requirements?

Suggested Measure List for BACM and MSM Analysis

We propose to find that the MAG plan evaluates a comprehensive set of potential technology-based controls for on-road motor vehicle exhaust emissions including potential most stringent measures from other States as well as provides information on their technological feasibility, costs, and energy and environmental impacts when appropriate.

The suggested technology-based measures for controlling emissions from on-road motor vehicle exhaust fall into one of five categories: new emission standards, inspection and maintenance programs, fuels, programs to encourage alternatively-fueled vehicle usage, and programs to accelerate fleet turnover. See Table ORM-4. Tailpipe emissions are also controlled through the implementation of transportation control measures (TCMs) to reduce congestion and vehicle miles traveled and trips. We discuss TCMs in the next section.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

Even prior to the MAG plan, Arizona had in place one of the nation's most comprehensive programs to address on-road motor vehicle emissions. With the additional measures in the MAG plan (including a more stringent diesel I/M program and measures both

encouraging and requiring diesel fleet turnover) the overall mobile source program is both strengthened and goes beyond the existing program. See Table ORM-4. Both strengthening and expanding existing programs are key criteria for demonstrating the implementation of BACM. See *Addendum* at 42013. Where the MAG plan has rejected potential BACM, it provides a reasoned justification for the rejection.

The MAG plan identified just a few measures from other areas as being more stringent than existing programs. These measures have either been adopted or we have concluded, based on information provided in the plan, that the measures need not be adopted to assure that the plan includes MSM. See Table ORM-4.

Except for one measure, all the adopted BACM and MSM were implemented by June 10, 2000, the BACM implementation deadline for the Phoenix area. The requirement that pre-1988 HDDV registered in the nonattainment area to meet 1988 federal emission standards will not be fully implemented until January 1, 2004, in order to provide sufficient lead time for modification or replacement of the non-complying heavy duty diesel vehicles.

We, therefore, propose to find that the combination of on-road motor vehicle technology controls and TCMS (described in the next section) in the MAG plan provides for the implementation of RACM and BACM and the inclusion of MSM for on-road motor vehicle exhaust. See Table ORM-4.

TABLE ORM-4				
ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
SUGGESTED BACM				
Emission standards for gasoline engines	adopt CA low-emissions vehicle program	No	Yes	State will participate in EPA’s National LEV program instead. A.R.S. 49-556 (1998). EPA’s new Tier II standards are very close to CA’s standards. Programs implemented and enforced by EPA. PM-10 benefits of the program not calculated due to limitations in emission models. MAG TSD, p. V-47.
	catalyst retrofit/replacement program	Yes		SB 1427 (1998), section 39 allocated \$275,000 to ADEQ to implement the Vehicle Repair Grant Program in A.R.S. 49-542 S and to implement the Catalytic Converter Replacement Program in A.R.S. 49-542 R. MAG plan, p. 7-11. These programs are aimed at high-emitting vehicles. See A.R.S. 49-542 R & S. Program became part of the County voluntary vehicle repair and retrofit program in 2000. See p. 18 of the 2001 I/M SIP submittal.
	vehicle repair and retrofit program	Yes		A.R.S. 49-474.03 D. (1998) requires Maricopa County to develop programs for the repair or retrofit of vehicles that fail the emissions inspection test. The programs are voluntary and requirements for eligibility include: (1) vehicle must be functionally operational, (2) vehicle is titled in Arizona and registered in Area A or B for at least 24 months, (3) vehicle is at least 12 years older than the current model year passenger car or light-duty truck, (4) vehicles that failed emissions testing before repair or retrofit. S.B. 1427, section 38 allocated \$800,000 to fund the program, \$640,000 was allocated to Maricopa County for the period, January 22, 1999 through June, 2000. An additional \$1,920,000 was allocated for FY 2001. From January 1999 to October 2000, 2153 vehicles have been repaired or had catalyst retrofit kits installed. See MCESD, Voluntary Vehicle Repair and Retrofit Program, Final Report, 2000 found in Appendix G of the 2001 I/M SIP submittal.

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
Emission standards for diesel engines	require pre-1988 HDDV registered in the N/A to meet 1988 federal emission standards	Yes	A.R.S. 49-542 F.7. (1996) requires that after January 1, 2004, a diesel powered motor vehicle with gross wight of more than 26,000 lbs registered in Area A (Phoenix nonattainment) must meet emission standards contained in 40 CFR 86.088-11 (1988 federal emission standards) unless it was manufactured in or after the 1988 model year. MAG plan, p. 7-15. Program will be funded and enforced as part of the overall State I/M program. A.R.S. 49-542 D.
	heavy-duty diesel engine replacement or overhaul at recommended intervals	Yes	A.R.S. 49-474.03 (1998) requires Maricopa County to establish and coordinate a Voluntary Vehicle Repair and Retrofit (VVRP) program in Area A by January 1, 1999. The program, which must be coordinated with ADEQ and ADOT, is focused on older model year heavy-duty diesel vehicles. The legislation allows diesel powered vehicles over 8,500 lbs that fail roadside vehicle tests to be eligible for up to \$1000 in repair or retrofit costs. MAG plan, p. 7-15. VVRP program was funded with \$800,000. SB 1427 (1998), section 38. \$640,000 was allocated to Maricopa County for the period, January 22, 1999 through June, 2000. An additional \$1,920,000 was allocated for FY 2001. 20% of these allocations can be used for diesel repairs. See MCESD, Voluntary Vehicle Repair and Retrofit Program, Final Report, 2000 found in Appendix G of the 2001 I/M SIP submittal and page 18 of that submittal.
	retrofit existing diesel vehicles	Yes	A.R.S. 9-500.04, 15-349, 41-803, 49-474.01, and 49-573 require public agencies operating fleets (cities, towns, Maricopa County, school districts, the state and federal government) to install oxidation catalyst on their heavy-duty diesel vehicles on a schedule set by A.R.S. 49-555 IF the entities receive a waiver to opt out of alternative fuel requirements. The replacement catalyst must reduce particulate emissions by 25% and be approved by EPA under the Urban Bus Engine Retrofit/Rebuilt Program. MAG plan, p. 7-25.

TABLE ORM-4				
ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
Vehicle testing (Note: there is no means of calculating PM-10 emissions from I/M programs for gasoline-powered vehicles; therefore, reductions from these measures are unknown.)	phased-in emission test cutpoints	Yes		More stringent I/M 240 final standards for vehicle emission testing were mandated to be effective on January 1, 1997, but were not implemented due to problems with false failures. MAG plan, p. 6-7. HB 2237, section 19 (1997) appropriated \$120,000 to ADEQ to develop and implement an alternative test protocol to reduce the false failure rates. New test procedures for transient loaded emissions standards (I/M 147) for 1981 and newer vehicles have been implemented. 2001 I/M SIP submittal, p. 5. Program will be funded and enforced as part of the overall State I/M program. A.R.S. 49-542 D.
	<i>transient</i> loaded mode test for 1967-1980 vehicles and 1981 and new HD gasoline trucks	No	Yes	Implementation of this program would increase emissions, MAG plan, p. 5-6.
	enhanced testing of constant four-wheeled vehicles	Yes		A.R.S. 49-541.01 (1999) which requires biennial transient loaded emissions testing program for constant four-wheel drive vehicles starting with model year 1981. MAG plan, p. 7-8. Implementation of this measure has been delayed because of funding constraints preventing the purchase of dual-axle dynamometers in several locations throughout the inspection station network. The program is authorized for implementation starting on January, 1 2002. Currently these vehicles are subject to a curb idle test because they cannot be tested on the single dynamometer used for transient loaded emissions test. A.R.S. 49-541.01. and AAC R18-2-1006. 2001 I/M SIP submittal, p. 5.
	geographic expansion of emissions testing program	Yes		A.R.S. 49-541.01 B. (1998) expanded the geographic coverage of the I/M program requirements to more parts of Maricopa County and parts of Pinal and Yavapai Counties. Program to be implemented by December 31, 2000. See MAG plan, pp. 7-66 to 7-69. Program will be funded and enforced as part of the overall State I/M program. A.R.S. 49-541.01. and AAC R18-2-1001. 2001 I/M SIP submittal, p. 5.

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	one-time waiver	Yes	A.R.S. 49-542 D. (1996) limited the issuance of waivers for failure to comply with emission testing requirements to 1-time only beginning January 1, 1997. MAG plan, p. 7-10. Program will be funded and enforced as part of the overall State I/M program. A.R.S. 49-542 D and AAC R18-2-1008. 2001 I/M SIP submittal, p. 16.
	no-waiver or increased waiver repair options	Yes	A.R.S. 49-542 D. (1998) doubled to \$200 the amount a person must spend to repair a failing 1967-1974 vehicle in area A to qualify for a waiver. MAG plan, p. 7-10. AAC R18-2-1010 E. Waiver repair amounts for other vehicles are up to \$400 for gasoline powered vehicles and \$500 for HDDV. A.R.S. 49-542 L.1. and AAC R18-2-1010 E. Program is funded and enforced as part of the overall State I/M program. A.R.S. 49-542 D.
	vehicle pollution charge	No	Yes
			This measure was recommended only after completion of additional studies to determine appropriate and feasible implementation mechanisms and after resolution of the technical problems associated with the final cutpoints in the I/M 240 program. The measure, if implemented, would link vehicle registration fees to the results of the emission testing program so that higher fees would be charged to vehicle owners whose vehicles emit higher levels of pollutants. Purpose of the fees is to encourage the retirement of older, more polluting vehicles. Program would likely have substantial adverse and disproportionate impact on low income households and mobility because these household are most likely to operate older, higher polluting cars. The State has other programs that encourage repair or replacement of these vehicles that essentially have the same result without the adverse affects. See voluntary gasoline vehicle repair and retrofit program above. The feasibility of this program has never been demonstrated. It has not been implemented elsewhere in the U.S.

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	enhanced light duty vehicle emissions testing/ loaded-mode vehicle emissions testing	Yes	In 1995, Arizona implemented an enhanced vehicle emission testing program. A biannual transient loaded emissions test for gasoline powered vehicles model year 1981 and newer. A.R.S. 49-542 F.2.a. 1980 and earlier must pass a steady-state loaded-mode and curb idle test. A.R.S. 49-542 F.2.b. Program is funded and enforced as part of the overall State I/M program. A.R.S. 49-542 D. In addition, ADOT is implementing additional methods to improve registration compliance to better enforce the I/M program. The new methods include (1) an expanded registration enforcement team, (2) a registration enforcement tracking program and a new resident tracking program. Additional methods to ensure better compliance were implemented in 1998 and 1999 including new requirements for vehicles in school and government parking lots. MAG plan, pp. 7-13 to 7-14.

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	remote sensing	No Yes	A random on-road testing program, using remote sensing, was initially established in 1993 as a supplement to the Vehicle Emissions Inspection Program. On the first identification of a vehicle, a notification was sent to the vehicle owner requiring an emissions test within 30 days. MAG plan, p. 4-6. In 2000, HB 2104 replaced this on-road testing program with a study designed, in part, to identify more accurate and cost-effective testing methods, given the large dollar per ton cost of the original program. 2001 I/M SIP submittal, p. 26. The remote sensing program tested for CO and VOC emissions. Projected PM-10 emission reductions from the program were not calculated, but were likely to be less than one-half ton per year (or 2.6 lbs per day), too small a reduction for remote sensing to be considered an available PM-10 control measure. ⁴⁷ The State does continue to do road-side testing as part of its I/M program.

⁴⁷Estimated reductions calculated assuming the same ratio of CO reductions to PM-10 reductions for remote sensing as for expansion of area A. ADEQ estimated that the expansion of Area A would result in a 2,727 ton per year reduction in CO and a 0.99 ton per year reduction in PM-10 and that remote sensing would result in a 1, 336 ton per year reduction in CO. Using the 0.99/2727 ratio, estimated PM-10 reductions from remote sensing would be 0.48 tons per year or 2.6 lbs per day. See 6 AAR 382, 393 (January 21, 2000).

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	toll-free number to report gross emitting vehicles	No Yes	The smoking-vehicle hotline was initiated in October 1996 and allows the public to use a local phone to report vehicles observed emitting excessive tailpipe smoke. In response to calls, ADEQ mails the vehicle owner a letter recommending an emissions test. The State rejected making this number toll-free since the program is aimed at callers within Area A. The increased costs associated with setting up the new line and reproducing and distributing additional outreach materials were not deemed cost-effective. ADEQ commitments. Smoking vehicles may now also be reported through the Internet. See MCESD's web site at www.maricopo.gov/mcvsvc and ADEQ's website at www.adeq.state.az.us/enviro/air/vei
Vehicle inspection - HDDV	snap acceleration test for HDDV/enhanced HD diesel emissions testing	Yes	A.R.S. 49-592 F.7. (1996) requires that after March 1, 1997, HD diesel vehicles over 8,500 lbs to take the annual snap acceleration test conforms to SAE standard J1667. beginning on 3/1/97 if the vehicles are registered in Area A and are more than 33 months beyond the initial registration. MAG plan, p. 7-14. Program was implemented in April 2000 and is funded and enforced as part of the overall State I/M program. A.R.S. 49-542 D. In addition, S.B. 1427, Section 35 (1998) authorized a pilot random roadside emissions test for diesel vehicles registered in Area A or Area B with a gross vehicle weight rating over 8,500 lbs. The pilot was to determine if the program should become permanent. 2001 I/M SIP submittal, p. 26.
Accelerated retirement	voluntary gasoline vehicle retirement program	Yes	A.R.S. 49-588 F.1. Allows major employers to meet their trip reduction targets through voluntary vehicle retirement program. Maricopa County revised its trip reduction ordinance to provide this option. MAG plan, p. 7-25. Resources and funding through existing program. MAG plan, p. 7-25.

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	voluntary diesel vehicle retirement	Yes	A.R.S. 49-474.03 (1998) requires Maricopa County to establish and coordinate a Voluntary Vehicle Repair and Retrofit program in Area A by January 1, 1999. The program, which must be coordinated with ADEQ and ADOT, is focused on older model year heavy-duty diesel vehicles. The legislation allows diesel powered vehicles over 8,500 lbs that fail roadside vehicle tests to be eligible for up to \$1000 in repair or retrofit costs. MAG plan, p. 7-15. Funded with \$800,000 statewide. SB 1427 (1998), section 38. \$640,000 was allocated to Maricopa County for the period, January 22, 1999 through June, 2000. An additional \$1,920,000 was allocated for FY 2001. 20% of these allocations can be used for diesel repairs. See MCESD, Voluntary Vehicle Repair and Retrofit Program, Final Report, 2000 found in Appendix G of the 2001 I/M SIP submittal and page 18 of that submittal.
Fuels - gasoline	opt into federal RFG program/adopt CARB phase 2 standards/ performance based standards for motor vehicle fuels/ tighter limits of sulfur content in gasoline	Yes	ADEQ adopted Cleaner Burning Gasoline (CBG) rules after incorporation of public comments on September 12, 1997. The CBG gasoline Type 2 specifications include performance standards for NOx and requirements for the fuel parameters sulfur, olefins and aromatic HCs. EPA took final action approving the SIP revision submitted on September 15, 1997, establishing CBG fuel requirements for gasoline distributed in the Phoenix (Maricopa County) ozone nonattainment area on February 10, 1998, 63 FR 6653. Phase II of the program which requires tighter fuel programs was implemented starting in 1999.

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	use of clean fuels on a statewide basis	No	Yes	A.R.S. 49-541.01 B. (1998) expanded the geographic coverage of the fuels program requirements to more parts of Maricopa County and parts of Pinal and Yavapai Counties. Program to be implemented by December 31, 2000. See MAG plan, pp. 7-66 to 7-69. Provision is enforced by AZ Department of Weights and Measures. A.R.S. 41-2065. Area A has been identified as the main area of influence contributing to pollutant emissions in the Maricopa Nonattainment Area. Vehicles operating in other portions of the State do not contribute significantly to emissions in the nonattainment area, thus reductions of emissions (from expansion of the CBG program) would have a relatively insignificant impact, thus it would not be cost effective to expand the CBG requirements and compliance efforts throughout the state. MAG plan, p. 6-4.
	reduced gasoline volatility	Yes		A.R.S. 41-2083 J (1993) limits the maximum summer vapor pressure (or Reid vapor pressure) of gasoline fuel sold in the Maricopa area to 7.0 psi beginning May 31, 1995 through September 30, 1995, and continues to apply from May 31 through September 30 of each year thereafter. We have approved this limit. See 62 FR 31734 (June 11, 1997). AAC R20-2-751. RVP is limited to 9 psi from November 1 to March 31 and in October and May; and 10 psi in April. A.A.C. R20-2-751. Provision is enforced by AZ Department of Weights and Measures. A.R.S. 41-2065.
	mandatory oxygenated fuels program/ increased oxygen content of ethanol blend	Yes		A.R.S. 41-2124 B. (1998) requires all gasoline sold in Maricopa County and Area A in the period from Nov. 2, 2000 though March 31 2001 of each subsequent year to contain a minimum 3.5 percent by weight oxygenate content. Provision is enforced by AZ Department of Weights and Measures. A.R.S. 41-2065. A.A.C. R20-2-751
Fuels - diesel	CARB diesel or other clean diesel	No	Yes	See discussion on CARB diesel below.

TABLE ORM-4				
ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	limit sulfur content of diesel oil to 500 ppm	Yes		A.R.S. 41-2083 J (1996) restricts the sale of diesel fuel in Area A to a maximum sulfur content of 500 ppm. Provision is enforced by AZ Department of Weights and Measures. A.R.S. 41-2065.
	truck stop electrification	No	Yes	Measure rejected because it would result in insignificant emissions reductions due to an insignificant number of facilities in the nonattainment area. MAG plan, p. 6-5.
Alternatively fueled vehicles	encourage the construction & operation of alternative fuel fueling stations/ incentives for the use of compressed natural gas/ alternative fuels for general vehicle use (tax incentives)	Yes		A.R.S. 43-1086, 43-1086.01, 43-1128.01, and 43-1174.01 provide both tax credits and deductions for the construction and operation of new fueling stations for alternatively-fueled vehicles and the purchase, leasing, or conversion of alternatively-fueled vehicles. Alternative fuels are defined as natural gas, propane, electricity, solar energy, hydrogen or mixes of natural gas or propane with gasoline or diesel. MAG plan, pp. 7-22 to 7-24.
	alternative fuels for fleets/conversion of buses to alternative fuels	Yes		A.R.S. 9-500.04, 15-349, 41-1516, 49-474.01, and 49-573 set requirements for fleets and buses operated by cities, towns, schools and state and federal agencies in Area A. At a minimum, the vehicles must (1) meet the EPA LEV standards (40 CFR 88.104-94 - 88.105-94), or (2) meet the provisions of EPA Memorandum 1-A or (3) qualify for a waiver under EPA Memorandum 1-A at fixed rates established by the applicable A.R.S. sections. MAG plan, pp. 7-19 to 7-22.
	reporting requirements for fleets using alternative fuels	Yes		A.R.S. 41-803 requires all state agencies to report annually on cost, operation, maintenance, and mileage to the AZ Department of Administration who must then report to the State Legislature and the Governor. MAG plan, p. 7-22.

TABLE ORM-4 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TECHNOLOGY-BASED)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	public education program for alternative fuels	Yes		A.R.S. 41-1516 (1998) allows monies from the State Clean Air Fund to be used to conduct public awareness programs for alternative fuels. MAG plan, p. 7-24.
MOST STRINGENT MEASURES				
Clean fuels	CARB diesel	No	Yes	The MAG plan claims measure is not reasonable on cost basis. (pg 9-46) We note that the State has already adopted half of the CARB diesel standards, the 500 ppm sulfur limit. (S.B. 1002) We have also recently adopted a 30 ppm diesel sulfur standard which will apply to the Phoenix area. We propose to find that the MAG plan can provide for MSM to our satisfaction absent the adoption and implementation of CARB diesel because, based on existing information, the on-road vehicle emissions are not implicated in 24-hour exceedances in the Phoenix area. All currently available evidence is that 24-hour exceedances are caused by local fugitive dust sources and controls on these sources alone will result in the earliest practicable date for attainment of the 24-hour PM-10 standard in the Phoenix area. Microscale plan, pp. 17-19. Because implementation of CARB diesel would not result in an earlier attainment date and thus unnecessary for expeditious attainment, we propose to find that the MAG plan provides for the inclusion of MSM to our satisfaction absent the adoption and implementation of CARB diesel.
Vehicle standards	HD diesel engine replacement	N/A		Arizona has implemented other programs to mandate or encourage the retrofitting/replacement of diesel engines. See program listed above under BACM - Emission Standards for Diesel Engines.
Vehicle retirement	scrappage program for HD diesel	No	Yes	Arizona has implemented other programs to mandate or encourage the retrofitting/replacement of diesel engines. See program listed above under BACM - Emission Standards for Diesel Engines.

This section prepared by Karina O'Connor and Frances Wicher

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR ON-ROAD MOTOR VEHICLE EXHAUST AND PAVED ROAD DUST (TCMS)

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including the measure's technological feasibility, costs, and energy and environmental impacts as needed, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM. Plans that identify on-road motor vehicles as a significant sources must also evaluate the transportation control measures listed in section 108(f) of the CAA. *Addendum* at 42013.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State "demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area." CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and

economic feasibility for the area. Next, the plan must compare potential most stringent measures for the significant source category against the existing BACM or other measures, if any, for that source category. For more any measures found most stringent, the plan must provide for the adoption of those measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies on-road motor vehicle exhaust and paved road dust as significant sources of PM-10 in the Phoenix area. MAG plan, Table 9-1. Transportation control measures reduce PM-10 emissions from both these categories.

Description of On-road Motor Vehicle Exhaust and Paved Road Dust Source Categories

The on-road motor vehicle exhaust category includes tailpipe and tire wear emissions of primary PM-10 from on-road motor vehicles. On-road motor vehicles include both gasoline and diesel-powered passenger cars, light, medium, and heavy duty trucks, buses, and motorcycles.

Paved road dust is fugitive dust that is deposited on a paved roadway and then is re-entrained into the air by the action of tires grinding on the roadway. Re-entrained road dust emission rates are not affected by vehicle speed but are affected by the silt loading on the road and amount of vehicle travel on a road. Emission rates are lower per mile traveled on higher traveled roads than they are on roads that receive less traffic.

PM-10 Emissions from On-road Motor Vehicle Exhaust and Paved Road Dust in the Phoenix Area

The MAG plan includes motor vehicle exhaust emissions from all types of on-road vehicles in the Phoenix area. See 1994 Regional PM-10 Emissions Inventory, Chapter 6, summarized in Table TCM-1. On-road motor vehicle exhaust accounts for 3.3 percent of the total directly-emitted, non-windblown 1994 PM-10 inventory (1994 Regional Inventory, Table 2-3) and 1.2 percent of the 2006 pre-control PM-10 inventory (MAG TSD, Table II-3). Total on-road vehicle exhaust PM-10 drop by a third from 1995 to 2006 due primarily to fleet turnover to cleaner vehicles and new fuel standards. MAG TSD, Tables II-1 and II-3. The microscale analysis, however, does not identify on-road motor vehicle exhaust as an explicit contributor to 24-hour exceedances. Microscale plan, p. 17-19.

Paved road dust is one of the largest categories in the regional PM-10 inventory, accounting for 39.1 percent of the total directly-emitted, non-windblown 1994 PM-10 inventory (1994 Regional Inventory, Table 2-3) and 20.4 percent of the 2006 pre-control total (including windblown) PM-10 inventory (MAG TSD, Table II-3). Total uncontrolled paved road dust

emissions increase by almost 30 percent third from 1995 to 2006 due to the increase in vehicle miles traveled (VMT). MAG TSD, Tables II-1 and II-3. The microscale analysis, however, showed that paved road dust was a very small contributor to 24-hour exceedances. Microscale plan, p. 17-19.

TABLE TCM-1 1994 EMISSIONS FROM ON-ROAD MOTOR VEHICLE EXHAUST, TIRE WEAR, AND PAVED ROAD DUST IN THE PHOENIX PM-10 NONATTAINMENT AREA		
CATEGORY	METRIC TONS PER DAY	
	GASOLINE	DIESEL
Light duty vehicles (e.g., cars)	0.44	0.05
Light duty trucks	0.31	0.12
Heavy duty trucks	0.26	3.62
Motorcycles	0.01	0
Totals vehicle exhaust and tire wear	1.02	3.8
Paved road dust	56.4	

Source: 1994 Regional PM-10 Inventory, Tables 2-3 and 6-9

Existing Controls

Arizona has a long history of adopting and then enhancing programs to reduce emissions from on-road motor vehicles by reducing vehicle miles traveled, vehicle trips, and/or congestion.⁴⁸ In most instances, these programs were adopted and implemented as part of carbon monoxide and ozone control programs, but they do have carry over effects on PM-10. Table TCM-2 lists a number of the transportation control measures.

⁴⁸ These plans include the MAG moderate area ozone and carbon monoxide plans and the serious area CO plan.

TABLE TCM-2 SUMMARY OF ARIZONA PROGRAMS AFFECTING ON-ROAD MOTOR VEHICLE EMISSIONS TRANSPORTATION CONTROL MEASURES	
PROGRAM TYPE	STATE PROGRAM
Congestion Management	
Traffic light synchronization	State law (ARS 28-642) requires all roadways with traffic flow greater than 15,000 vehicles per day to have traffic light synchronized. MAG plan, p. 4-9.
Freeway incident management	55 miles of freeway will be covered with variable message signs, ramp meters, cameras, and loop detectors all working to maintain free flow on the freeway. MAG plan, pp. 2-13, 4-9, & 5-50.
VMT and VT Reduction	
Trip reduction program	County Trip Reduction Ordinance (P-7) requires all employers with greater than 50 employees to provide incentives to reach certain trip reduction goals. MAG plan, p. 4-9. Program approved 63 FR 24434 (May 4, 1998).
Public education	Clean Air Campaign has been on-going since 1987 and involves extensive public outreach on air pollution and ways individual can reduce their contributions. MAG plan, pp. 2-12
Transit improvements	Many jurisdiction provide transit service including Phoenix, Tempe, and Mesa. Many others contract with the Regional Public Transportation Authority to provide services. See MAG plan, p. 4-11. Service improvements are on-going. See MAG, <i>Draft MAG Conformity Analysis</i> , June 2001, pp. 3-9 to 3-11.

Does the plan meet the statutory and policy requirements?

Suggested Measure List for BACM and MSM Analysis

We propose to find that the MAG plan evaluates a comprehensive set of potential TCMs for on-road motor vehicle exhaust emissions including those listed in section 108(f) of the CAA as required by our guidance (*Addendum* at 42011) and potential most stringent measures from other States. The MAG plan also provides information on their technological feasibility and costs.

The suggested TCMs for controlling emissions from on-road motor vehicle exhaust fall into one of two categories: congestion management aimed at reducing delays and stop and go traffic (i.e., increasing speeds) and travel reduction programs aimed at reducing vehicle miles

traveled or vehicle trips. Only travel reduction programs are effective at reducing paved road dust because only VMT affects emissions from paved roads. Vehicle speeds do not significantly affect emission rates of paved road dust. See Table TCM-3.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

Even prior to the MAG plan, the Phoenix area already had in place a comprehensive set of TCMs. See Table TCM-2. With the additional measures in the MAG plan (including additional traffic light synchronization, transit improvements, and bicycle and pedestrian facility improvements), the overall TCM program is strengthened and goes beyond the existing program. See Table TCM-3. Both strengthening and expanding existing programs are key criteria for demonstrating the implementation of BACM. See *Addendum* at 42013. Where the MAG plan has rejected potential BACM, it provides a reasoned justification for the rejection.

The MAG plan identifies no measures from other areas more stringent than existing local programs.

All the adopted TCM BACM are were implemented by June 10, 2000, the BACM implementation deadline for the Phoenix area, or have on-going implementation schedules because they are part of a on-going capital improvement program. (e.g., signal synchronization).

We propose to find that the combination of on-road motor vehicle technology controls (described in the previous section) and TCMs in the MAG plan provides for the implementation of RACM and BACM and inclusion of MSM for on-road motor vehicle exhaust. See Table TCM-3. We also propose to find that the combination of TCMs and paved road dust measures (described in the paved road section later in this TSD) provides for the implementation of RACM and BACM and inclusion of MSM for paved road dust.

In our review, we have primarily assessed the MAG plan's provisions for implementing RACM and BACM and including MSM through TCMs based on the measures' effectiveness in controlling directly-emitted PM-10 from vehicle exhaust and paved road dust. We have not assessed the plan based on the TCM's potential benefit in controlling PM-10 precursors such as NO_x and SO_x through TCMs because 1) from available ambient measurements, neither nitrates nor sulfates are important to overall PM-10 concentrations in the Phoenix area ⁴⁹ and 2) Arizona already has already targeted mobile source NO_x and SO_x through an aggressive set of mobile source controls from motor vehicles including its vehicle emissions inspection program and

⁴⁹ Total secondary particulate from all sources contributed less than 4 µg/m³ on average to daily PM-10 levels in 1995 with a maximum contribution of 9.2 µg/m³. See MAG TSD, p. III-40. The 24-hour PM-10 standard is 150 µg/m³, so total secondaries contribute less than 3 percent to average 24-hour PM-10 levels and 6 percent when secondaries are at their highest combined levels.

Cleaner Burning Gasoline program which we believe cover the RACM, BACM and MSM requirements for tailpipe NO_x and SO_x. See previous section “Implementation of BACM and Inclusion of MSM for On-Road Motor Vehicles (Technology Controls).”

The MAG plan rejects as technologically infeasible TCMs that reduce congestion by relocating trips spatially or temporally. These measures simply move emission from one place to another and from one time of the day to another and provide no benefit for attaining the 24-hour PM-10 standard because of the regional nature of the standard and its long averaging time. MAG plan, p. 9-16. We agree with this reasoning.

The plan also rejects as technologically infeasible any TCMs that reduce trips or reduce exhaust emissions of NO_x because they “were determined to conflict with attainment of the ozone air quality standard as modeling has shown that NO_x reductions will produce ozone increases.” MAG plan, p. 9-17. While this reasoning is inconsistent with attainment demonstration for the annual standard which includes 8 mtpd in NO_x emission reductions from various State measures as well as over 12 mtpd in reductions from the national low emission vehicle program, it does not affect our proposed conclusion that MAG plan provides for implementation of RACM and BACM and includes MSM through technology-based programs because the plan still includes a number of TCMs in addition to ones already implemented in the area and because secondary particulate is not implicated in 24-hour standard violations. Violations of the 24-hour standard are due to fugitive dust emissions and not secondary particulate.

The MAG plan shows that jurisdictions are implementing TCMs to varying degrees, which can be attributed to differences in local road conditions, local transportation options, and budgets. CAA requirements to implement BACM and include MSMs are a collective obligation of the nonattainment area and not of individual jurisdictions within that nonattainment area. Therefore, to judge whether the MAG plan provides for implementation of BACM and for the inclusion of MSM, we have focused on the combined effect of local commitments on the region as whole rather than judging compliance jurisdiction by jurisdiction.

Moreover, because BACM and MSM are obligations of the nonattainment area, we do not judge one jurisdiction’s efforts against another nor consider one jurisdiction’s efforts to set a BACM or MSM standard that other jurisdictions must meet or provide a justification for not doing so. Just because one jurisdiction has adopted a measure does not compel the others under the BACM or MSM requirements to do the same.

TABLE TCM-3 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TRANSPORTATION CONTROL MEASURES)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
SUGGESTED BACM			
Congestion management/idling reduction	removal of on-street parking	Yes	This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-19 to 8-20.
	optimize freeway ramp meters	Yes	This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-7.
	HOV lane pricing	No	Yes Measure is a mechanism for taking advantage of underused roadway capacity in the HOV lanes and would result in higher overall average speeds in the general traffic lanes. MAG plan, p. 5-48. Not adopted. We find this to be a trivial flaw because as a congestion relief measure it has minimal benefits for directly-emitted PM-10 and because it could lead to more congested HOV lanes it may undermine carpooling.
	coordinate traffic signal systems	Yes	Widely adopted for CO and ozone control. Measure has minimal benefit for directly-emitted PM-10, an estimated 2.4 kg per day from 435 synchronized lights. MAG TSD, Appendix 4, committed measure 16. MAG plan, pp. 7-204 to 7-208.
	reduce traffic congestion at major intersections	Yes	Widely adopted where appropriate (many communities reported no congested intersections). MAG plan, pp. 7-208 to 7-213
	reversible lanes	Yes	This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-28.
	freeway incident detection and response management	Yes	This measure is implemented. See MAG plan, p. 4-9.

TABLE TCM-3
ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST
(TRANSPORTATION CONTROL MEASURES)

TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	mitigation of freeway construction impacts	Yes		Mitigation here means reduce impact of construction on traffic and not fugitive dust control which is covered under MCESD Rule 310. This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-29.
	one way streets	Yes		This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-30.
	on-street parking restrictions	Yes		This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-19 to 8-20.
	bus pullouts in curbs for passenger loadings	Yes		This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-31.
	off-peak goods movement	No	Yes	Measure reduces congestion by reducing number of trucks during peak travel times. Measure does not reduce the overall amount of truck traffic. No measures were adopted and no justification for rejecting the measure was provided. We find this to be a trivial flaw because congestion management has minimal to no impact on directly-emitted PM-10.
	truck restrictions during peak periods	No	Yes	Measure reduces congestion by reducing number of trucks during peak travel times. Measure does not reduce the overall amount of truck traffic. No measures were adopted and no justification for rejecting the measure was provided. We find this to be a trivial flaw because congestion management has minimal to no impact on directly-emitted PM-10.
	programs to control extended idling of vehicles	Yes		RPTA has an engine idling policy. See MAG plan, p. 7-66. No further measures to control extended idling were included in the plan. We find this a trivial flaw because PM-10 emissions from on-road motor vehicles are a very small percentage of total 1994 emissions in the area, 3.4 percent (4.1 mtpd out of a total inventory of 141 mtpd

TABLE TCM-3 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TRANSPORTATION CONTROL MEASURES)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
				(MAG, table 1.1)) and will decrease by 30 percent by 2006. Emissions from extended idling are a very small fraction of these emissions. Therefore, any potentially lost emission reductions from unadopted extended idling measures are inconsequential.
	modification of work schedules	Yes		This measure has already been extensively implemented in previous plans and continues to be implemented through state law and Maricopa County trip reduction program. See MAG plan, Appendix B, Exhibit 2, pp. 8-46 to 8-48.
	traffic diversion	Yes		Measures requires ADOT to place signs outside on I-10 outside of the Phoenix area encourage vehicles passing not bound for Phoenix to bypass the area. Measure implemented as a CO contingency measure in 1996.
	develop intelligent transportation systems	Yes		This measure is being implemented through ADOT's freeway management system and pilot programs in the area. MAG plan, pp. 7-31 to 7-37.
	limit excessive car dealership vehicle starts	No	Yes	Total PM-10 emissions from automobiles are very small at 1.01 mtpd out of a total inventory of 141 mtpd (1994 figures, MAG, table 1.1). Idle emissions are a fraction of this; therefore, this measure would have minimal to no benefit to attaining the 24-hour standard. Exceedances of the 24-hour standard are due to fugitive dust sources and not vehicle emissions.
	limit idling time to 3 minutes	No	Yes	RPTA has an engine idling policy. See MAG plan, p. 7-66. Total PM-10 emissions from on-road motor vehicles is a small percentage of total emissions in the area, 3.4 percent (4.1 mtpd out of a total inventory of 141 mtpd (1994 figures, MAG, table 1.1)). Idle emissions are a fraction of this; therefore, this measure would have minimal to no benefit to attaining the 24-hour standard.
	modified business hours	No	Yes	This measure is a CO control measure without benefit for PM-10. MAG plan, Table

TABLE TCM-3 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TRANSPORTATION CONTROL MEASURES)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	for private and public sector during high pollution season to reduce cold start emissions			5-2, measure 90.
	enforcement of traffic, parking, and air pollution regulations	Yes		MCESD has increased enforcement efforts. State has increased enforcement of I/M testing requirement. MAG plan, p. 7-13. Local programs to enforce traffic and parking are not addressed but absent any information to the contrary, we assume local jurisdictions enforce their regulations to a reasonable degree.
VMT and VT reduction	mass transit alternatives	No	Yes	Mass transit alternatives are being studied but funding remains uncertain.
	expansion of transit	Yes		MAG plan, pp. 7-185 to 7-192. Service improvements are on-going. See MAG, <i>Draft MAG Conformity Analysis</i> , June 2001, pp. 3-9 to 3-11.
	fuel tax increase	No	Yes	Measure rejected by Governor's Alternative Transportation Systems Task Force because of low ranking re: public acceptance, community impact on low income households and mobility; medium impact on air quality, and high cost of implementation. MAG plan, p. 5-50. We know of no jurisdiction that has adopted a fuel tax increase as a means of reducing air pollution.
	special events control	Yes		MAG plan, pp. 7-37 to 7-41.
	transit service improvements in combination with park and ride lots and parking management	Yes		RPTA has program to promote and expand park & ride lots. MAG plan, p. 7-279. In addition, this measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-33.

TABLE TCM-3 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TRANSPORTATION CONTROL MEASURES)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	fringe and transportation corridor parking facilities serving HOV programs or transit services			
	park & ride programs			
	fixed lanes for buses and carpools on arterials	Yes	This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-7.	
	fixed lanes for buses and carpools on freeways	Yes	This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-7.	
	HOV ramps which by- pass freeway ramp meter signals	Yes	MAG plan, p. 4-9.	
	employer rideshare program incentives	Yes	Maricopa County Trip Reduction Program Ordinance requires employers to provide incentives to employees to reduce single occupant vehicle trips. We incorporated the program into the SIP on May 4, 1998 (62 FR 24431).	
	mandatory employee parking fees	No	Yes	In previous plans, considered an option under the Maricopa County Trip Reduction Program Ordinance. See MAG plan, Appendix B, Exhibit 2, p. 8-13. On comprehensive list of measures but not further addressed in MAG plan; no explanation for rejection given. We are not aware of any regional programs to require employee parking fees for air quality controls. This measure would likely have the same issues as increasing fuel tax: low public acceptance, community impact on low income households and mobility; with a medium impact on air quality and high cost

TABLE TCM-3 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TRANSPORTATION CONTROL MEASURES)				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
				(to individual and companies) of implementation.*
	preferential parking for carpools and vanpools	Yes		MAG plan, pp. 7-198 to 7-204. This measure has also been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-14.
	encouragement of vanpools for county and state employees	Yes		State and county agencies are subject to Maricopa County trip reduction ordinance under which employers as part of the trip reduction plans can include programs to encourage vanpooling. See Maricopa County Trip Reduction Ordinance, P-7. Also, RPTA also encourage the development of vanpool programs. See RPTA commitment, 97-TC-19.
	vanpools purchase incentives	Yes		State and county agencies are subject to Maricopa County trip reduction ordinance under which employers as part of the trip reduction plans can include programs to encourage vanpooling. See Maricopa County Trip Reduction Ordinance, P-7. Also, RPTA also encourage the development of vanpool programs. See RPTA commitment, 97-TC-19.
	merchant transportation incentives	No	Yes	No explanation given. Given the other TCM programs in the Maricopa area, we believe that the failure to include this measure does not effect a finding that the MAG plan provides for the implementation of BACM and inclusion of MSM for motor vehicle exhaust and road dust.
	trip reduction ordinances	Yes		Maricopa County Trip Reduction Ordinance approved May 4, 1998 (62 FR 24431)
	financial incentives, including zero bus fares	Yes		Maricopa County Trip Reduction Program Ordinance requires employers to provide incentives to employees to reduce single occupant vehicle trips. These incentives can include subsidized or free bus passes. See MAG plan, Appendix B, Exhibit 2, pp. 8-36 - 8-38.

TABLE TCM-3
ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST
(TRANSPORTATION CONTROL MEASURES)

TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	programs to limit portions of road surfaces or certain section of the metro area to the use of non-motorized vehicles or pedestrian use, both as to time and place	Yes	This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, p. 8-38.
	encouragement of bicycle travel	Yes	MAG plan, pp. 7-218 to 7-226.
	development of bicycle travel facilities	Yes	This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-39 to 8-45. MAG plan, pp. 7-226 to 7-232.
	modification of work schedule	Yes	This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-19 to 8-20. MAG plan, p. 7-232 to 738.
	telecommuting	Yes	This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-48 to 8-50. MAG plan, p. 7-279.
	teleconferencing	Yes	This measure has already been implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-50 to 8-51. MAG plan, p. 7-279.
	alternative work schedules	Yes	This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-46 to 8-48. MAG plan, p. 7-232 to 7-238.
	land use/development alternatives	Yes	MAG plan, p. 7-238 to 7-245.

TABLE TCM-3 ANALYSIS OF BACM AND MSM FOR ON-ROAD VEHICLE EXHAUST (TRANSPORTATION CONTROL MEASURES)			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	voluntary no drive day programs	Yes	This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-19 to 8-20.
	areawide public awareness programs	Yes	This measure has already been extensively implemented in previous plans. See MAG plan, Appendix B, Exhibit 2, pp. 8-19 to 8-20.
	evaluation of the air quality impacts of new development and mitigation of adverse impacts	No	Yes No explanation given. Given the comprehensiveness of the overall TCM program in the Maricopa area, we believe that the failure to include this measure does not effect a finding that the MAG plan provides for the implementation of BACM and inclusion of MSM for motor vehicle exhaust and road dust. [#]
	encouragement of pedestrian travel	Yes	MAG plan, pp. 7-245 to 7-253.
MOST STRINGENT MEASURES (NOT ALREADY IDENTIFIED IN BACM ANALYSIS)			
None identified.			

Source of measures: MAG plan, Tables 5-2 and 10-7.

Footnotes:

* A mandatory parking fee program is a “parking surcharge regulation” under the CAA. We are specifically barred from requiring states to include such regulations in their SIPs as a condition for approval. CAA section 110(c)(1)(B). So even if we considered that the failure of the State to implement this measure or to provide a reasoned justification for not implementing it as cause to disapprove the BACM demonstration, we could not do so because such a disapproval would be tantamount to requiring a parking surcharge regulation as a conditional for approval of the serious area plan. The general BACM requirement in section 189(b)(1)(B) does not override the very explicit bar in section 110(c)(1)(B).

A program to evaluate the air quality impacts of new developments and require mitigation of adverse impacts is an “indirect source review (ISR) program” under the CAA. We are specifically barred from requiring states to include ISR programs in their SIPs as a condition for approval. CAA section 110(a)(5)(a)(i). So even if we considered that the failure of the State to implement this measure or to provide a reasoned justification for not implementing it as cause to disapprove the BACM demonstration, we could not do so because such a disapproval would be tantamount to requiring an ISR program as a conditional for approval of the serious area plan. The general BACM requirement in section 189(b)(1)(B) does not override the very explicit bar in section 110(a)(5)(a)(i).

This section prepared by Frances Wicher.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR NONROAD ENGINES

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including the measure's technological feasibility, costs, and energy and environmental impacts as needed, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State "demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area." CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area. Next, the plan must compare potential most stringent measures for the significant source category against the existing BACM or other measures, if any, for that

source category. For more any measures found most stringent, the plan must provide for the adoption of those measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies nonroad engines as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-1.

Description of Nonroad Engine Source Category

The nonroad engine category covers a diverse collection of engines, equipment and vehicles fueled by gasoline, diesel, electric, natural gas, and other alternative fuels. Also referred to as "off-road" or "off-highway," the nonroad category includes outdoor power equipment, recreational equipment, farm equipment, construction equipment, lawn and garden equipment, and marine vessels. Though dealt with separately in the Clean Air Act, locomotives and aircraft are also considered categories of nonroad engines. (See 40 CFR Parts 89.103 for the definition of nonroad equipment and engines.)

As a legal matter, nonroad engines are distinct from highway (on-road) engines. Under the CAA, a nonroad engine is defined as an internal combustion engine that is not used in a motor vehicle and a motor vehicle is defined any self-propelled vehicle designed for transporting persons or property on a street or highway. See CAA sections 215(10) and (2). As practical matter, nonroad engines are generally distinguished from highway engines in one of four ways: (1) the engine is used in a piece of mobile equipment that propels itself in addition to performing an auxiliary function (such as a bulldozer grading a construction site); (2) the engine is used in a piece of equipment that is intended to be propelled as it performs its function (such as a lawnmower); (3) the engine is used in a piece of equipment that is stationary but portable, such as a generator or compressor; or (4) the engine is used in a piece of mobile equipment that propels itself, but is primarily used for off-road functions.

This category is also different from other mobile source categories because: (1) it applies to a wider range of engine sizes and power ratings; (2) the pieces of equipment in which the engines are used are extremely myriad; and (3) the same engine can be used in widely varying equipment applications (e.g., the same engine used in a backhoe can also be used in a drill rig or in an air compressor).

Emissions from Nonroad Engines in the Phoenix Area

The MAG plan includes emissions from all sources of nonroad engines in the Phoenix area. See 1994 Regional Emissions inventory, Chapter 5 and NRM-1. Nonroad engines account

for 6.1 percent of the total directly-emitted, non-windblown 1994 PM-10 inventory (1994 Regional Inventory, Table 2-3) and 4.8 percent of the 2006 pre-control PM-10 inventory (MAG TSD, Table II-3) with particulate emissions from diesel engines dominating the nonroad inventory in both years. Total nonroad vehicle exhaust PM-10 increases by 25 percent from 1995 to 2006 in the face of tighter engine and fuel standards because of increases in usage. MAG TSD, Tables II-1 and II-3. The microscale analysis, however, does not identify nonroad engines as a contributor to 24-hour exceedances. Microscale plan, p. 17-19.

TABLE NRM-1 1994 EMISSIONS FROM NONROAD ENGINES IN THE PHOENIX PM-10 NONATTAINMENT AREA			
CATEGORY	EXAMPLES OF EQUIPMENT IN THE CATEGORY	METRIC TONS PER YEAR	
		GASOLINE	DIESEL
Recreational vehicles	off-road motorcycles golf carts	5.4	0
Construction equipment	earthmoving equipment cranes	11.1	2199.3
Industrial equipment	forklifts material handling equipment	2.9	113.5
Light industrial equipment (utility equipment)	generators <50 hp air compressors < 50 hp pumps < 50 hp	10	25.1
Lawn and garden equipment	lawnmowers chainsaws leaf blowers	207.3	31.9
Agricultural equipment	tractors combines	0.3	94.6
Marine vessels	outboard engines inboard engines	5.1	0.2
Totals		242.1	2464.6

Source: MAG TSD, Appendix D1, Table D1-1

The MAG plan considers both locomotives and airport ground support equipment categories as de minimis. MAG plan, Table 9-1.

Existing Controls

1. National controls

We have adopted national emission standards which apply to a broad range of nonroad engines sold in Arizona. Note that only the diesel engines have emission standards related to PM-10 control.

Nonroad diesel engines. Tier 1 emission standards for nonroad diesel engines rated 37 kW and above were set in 1994 and start to apply beginning January 1, 1996. (Limits phase in based on engine size.) 59 FR 31361 (June 17, 1994). Tier 2 emission standards for these engines were issued on October 23, 1996 and become effective in the 2001 to 2006 timeframe. 63 FR 56968. Tier 3 emissions standards which were also issued on October 23, 1996 and become effective between 2006 and 2008. 63 FR 56968. These standards approximate the degree of control anticipated from existing standards covering engines used in heavy-duty diesel highway vehicles, with appropriate consideration of differences in size and operational characteristics of engines and in the organization of industries.

The final standards for engines rated under 37 kW are the first EPA emission standards for these engines. The Tier 1 standards will be phased in by power category beginning in 1999, with Tier 2 standards phased in by power category beginning in 2004. Tier 3 standards are not being set for these engines, or for engines rated over 560 kW. In power categories for which Tier 3 standards are finalized, we have chosen not to include more stringent PM standards. We have a number of reasons for deferring the establishment of a Tier 3 PM control program at this time. Primarily, we believe that Tier 3 PM standards will be more appropriately discussed in the context of the improved technical understanding that will exist by the time the Agency's 2001 feasibility review for nonroad engine standards is completed.

Marine engines. We have finalized regulations for recreational marine gasoline engines, including personal watercraft and outboard engines on October 4, 1996. 61 FR 52087. We issued initial standards for large diesel marine engine rule rated at or above 37 kW on December 29, 1999. 64 FR 73299. We published final standards for small marine diesel engines less than 37kw and even tighter diesel emission standards for engines rated above 37 kW on October 23, 1998. 63 FR 56967.

Small gasoline engines. We have also established a first phase of regulations for small spark-ignition (SI) engines rated at and below 25 hp, (60 FR 34581, July 3, 1995). On January 27, 1998 (63 FR 3949) we published a second phase proposing tighter emission standards for this category. However, because of dramatic advancements in small engine emission control technology we later published a supplemental notice on July 28, 1999 (64 FR 40939) reproposing a second phase of emission regulations to control emissions from new nonroad SI handheld

engines at or below 25 hp. The engines covered by this proposal are used principally in lawn and garden equipment such as trimmers, leaf blowers and chainsaws. We finalized these rules on April 25, 2000 (65 FR 24268).

Large gasoline engines. For large gasoline engines greater than 25 hp (e.g., forklifts, portable generators, pumps, crop sprayers, and other general industrial equipment), we are scheduled to release a proposal by September 2001. For recreational engines (e.g., go-carts, all-terrain vehicles, and snowmobiles), we published an advanced notice of proposed rulemaking on December 7, 2000 (65 FR 76797). Large gasoline engines and recreational engines are not currently subject to federal emission standards.

Other. We have also set emission standards for locomotive engines (63 FR 18977 (April 16, 1998)) and for aircraft engines (62 FR 25356, (May 8, 1997)).

2. State and local controls

Only California has authority to set emission standards for new off-road engines. Under CAA section 209(e), state and local standards and other requirements relating to emissions from nonroad engines and vehicles have been preempted since November 15, 1990. Other states may then adopt regulations identical to California's regulations, provided they notify EPA and give the appropriate lead time (see section 209(e)(2)(B)).

A.R.S. 49-542.04 gives ADEQ authority to adopt certain CARB off-road standards. On January 27, 1999, ADEQ sent a letter to us committing to complete rulemaking requiring the sale of off-road vehicles and engines meeting the standards of the CARB. A copy of this letter can be found in the ADEQ commitments. However, between the time Arizona committed to adopt these standards and today, EPA has promulgated new nonroad engine standards that approximate CARB's. ADEQ reviewed the effect of these new federal standards on nonroad emissions in the Phoenix area and compared it against the effect of adopting CARB's standards at this time. Its review showed that there would be only a marginal benefit to adopting CARB's standards at this time. ADEQ determined that this marginal benefit does not justify adopting those standards. Based on this determination, the State withdrew its commitment to adopt the CARB standards. See letter, Jacqueline E. Schafer, ADEQ to Laura Yoshii, EPA, "Justification for not implementing CARB Off-road engine standards for the Maricopa County PM₁₀ SIP," September 7, 2001. (ADEQ Off-road Letter). See also note below.

Arizona has both gasoline and diesel fuel quality standards. For gasoline, it has a summertime and wintertime Cleaner Burning Gasoline program. We approved the summertime program on February 10, 1998 (63 FR 6653). For diesel, the state sets a sulfur content for diesel fuels (to 500 ppm). See MAG plan, p. 7-17 and A.R.S. 41-2083 J. While aimed primarily at on-road vehicles, these programs also control emissions from nonroad engines.

Does the plan meet the statutory and policy requirements?

Suggested Measure List for BACM and MSM Analysis

The suggested measures for controlling emissions from nonroad engines fell into one of three categories: new emission standards, programs to accelerate fleet turnover, programs affecting usage, and fuels. See Table NRM-3.

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for nonroad engines including potential most stringent measures from other States as well as provides information on their technological feasibility, costs, and energy and environmental impacts when appropriate.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

The MAG plan includes a number of new measures for nonroad engines. See Table NRM-3. With the addition of these measures, the overall nonroad engine program is strengthened and goes beyond the existing program. Both strengthening and expanding existing programs are key criteria for demonstrating the implementation of BACM. See *Addendum* at 42013. Where the MAG plan has rejected potential BACM, it provides a reasoned justification for the rejection. We, therefore, propose to find that the MAG plan provides for implementation of RACM and BACM and the inclusion of MSM for nonroad engines.

On January 27, 1999, ADEQ sent a letter to us committing to complete rulemaking requiring the sale of off-road vehicles and engines meeting the certain California nonroad engine standards. However, September 7, 2001, ADEQ withdrew this commitment and provided a justification for not implementing the California standards. See note below. In the annual standard proposal, we proposed to find that the State met the RACM, BACM, and MSM requirements for the annual standard based in part on this commitment. We propose to find that the MAG plan continues to meet these requirements for the annual standard despite the withdrawal of the commitment because Arizona has provided a reasonable justification for it.

TABLE NRM-3 ANALYSIS OF BACM AND MSM FOR NONROAD ENGINES				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
SUGGESTED BACM				
California Off-Road Vehicle and Engine Emission Standards	New heavy-duty diesel vehicles rated at 175 - 750 hp	Yes		EPA has issued Tier 1 emission standards for nonroad diesel engines rated 37 kW and above in 1994. These standards applied beginning January 1, 1996. (Limits phase in based on engine size.) 59 FR 31361 (June 17, 1994). We issued Tier 2 emission standards for these engines on October 23, 1996 to become effective in the 2001 to 2006 timeframe. 63 FR 56968. We also issued Tier 3 emissions standards on October 23, 1996 to become effective between 2006 and 2008. 63 FR 56968. These standards are identical to CARB’s standards and automatically apply to Arizona.
	New small utility and lawn and garden equipment engines rated < 25 hp	No	Yes	A.R.S. 49-542.04 gives ADEQ authority to adopt CARB standards for small off-road engine category. ADEQ had committed to adopt these standards. However, based on the impact on resource, ADEQ has withdrawn this commitment, showing that any loss of emission reductions is minimal. See ADEQ Off-Road Letter and note below.
	Recreational vehicles rated < 25 hp; Specialty engines and go-carts; Off-road motorcycles and all-terrain vehicles; Golf cart engines (Maricopa County only) vehicles	No	Yes	A.R.S. 49-542.04 gives ADEQ authority to adopt CARB standards for these engines. ADEQ had committed to adopt these standards. However, based on the impact on resource, ADEQ has withdrawn this commitment, showing that any loss of emission reductions is minimal. See ADEQ Off-Road Letter and note below. Golf carts: telephone surveys in Maricopa County indicate that 99.5 percent of golf carts in the area are already electric. ADEQ Off-road letter, TSD, p. 2.
Accelerated retirement	Voluntary retirement program for gasoline powered lawn and garden equipment	Yes		A.R.S. 49-574.02 established a voluntary lawn mower emissions reduction fund. Maricopa County runs program (see Maricopa County commitment, Measure 2). Minimal reductions (less than 0.1% in 2001, MAG plan, p. 5-54), reduction not credited in attainment demonstration; measure used as a contingency measure. MAG plan, p. 8-17. Funded by legislature at \$1 M in FY 97/98 and \$500,000 per year in

TABLE NRM-3 ANALYSIS OF BACM AND MSM FOR NONROAD ENGINES				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
				98/99 and 99/00 to be split between Maricopa and Pima Counties. MAG plan, p. 7-42. Program ended in 2000. Program is voluntary, no enforcement program needed
Usage	Require government agencies to minimize user of gasoline-powered lawn and maintenance equipment	Yes		See commitments by local jurisdictions found in MAG plan, Commitment for Implementation, volumes 1- 4. Jurisdiction’s legal authority for measure are contained in the general powers granted cities/towns/counties under State law, ARS 11-251 and 9-240. Jurisdictions will use existing funds. Program is not regulatory; therefore, no enforcement program is needed.
	Ban sale/use of gasoline-powered lawn and garden equipment	No	Yes	Banning the use of gasoline-powered lawn and garden equipment is unreasonable, because there are on practical replacement for some equipment or the replacement, electric lawn and garden equipment, cannot be used in many applications because of the lack of or distance to electrical power (e.g., large residential lots, ranches, parks, commercial landscaping). Lawn and garden equipment is already subject to comprehensive controls including federal emission standards, fuel standards (the State’s Cleaner Burning Gasoline Program) and a State program that encouraged fleet turnover. We propose to find that these measures collectively provide for implementation of BACM on this nonroad engine category.
	Encourage use of temporary electrical power lines rather than portable generators at construction sites	Yes		See commitments by local jurisdictions found in MAG plan, Commitment for Implementation, volumes 1-4. No emissions reduction estimated. Jurisdiction’s legal authority for measure are contained in the general powers granted cities/towns/counties under State law, ARS 11-251 and §9-240. Jurisdictions will use existing funds. See commitments. Program is not regulatory; therefore, no enforcement program is needed.
	Defer emissions associated with governmental activities	Yes		See commitments by local jurisdictions found in MAG plan, Commitment for Implementation, volumes 1-4. No emissions reduction estimated. Jurisdiction’s legal authority for measure are contained in the general powers granted cities/towns/counties under State law, ARS 11-251 and §9-240. Jurisdictions will use

TABLE NRM-3 ANALYSIS OF BACM AND MSM FOR NONROAD ENGINES				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? IF NO, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
				existing funds. See commitments. Program is not regulatory; therefore, no enforcement program is needed.
MOST STRINGENT MEASURES				
Clean diesel fuels	Adopt Fuel Similar to CARB Diesel Fuel	No	Yes	The MAG plan claims measure is not reasonable on cost basis. (pg 9-46) We pass no judgement on this claim, given the uncertainties regarding benefits and costs. We note that the State has already adopted half of the CARB diesel standards, the 500 ppm sulfur limit. (S.B. 1002) We have also recently adopted a 30 ppm diesel sulfur standard which will apply to the Phoenix area. We propose to find that the MAG plan can provide for MSM to our satisfaction absent the adoption and implementation of CARB diesel because, based on existing information, the nonroad engine category's contribution to exceedances of the 24-hour standard are trivial. Exceedance of the 24-hour standard in the Phoenix area are cause by fugitive dust sources and it is controls on these sources that will bring about attainment of the 24-hour standard. See Microscale plan, pp. 17-19. Based on existing information, the implementation of CARB diesel would not benefit expeditious attainment of the 24-hour standard and, therefore, is not feasible for the area.
Emission standards	New heavy-duty construction equipment	Yes		We have adopted tier 2 and 3 emission standards for engines greater than 37 hp engines. 63 FR 56968 (October 23, 1998). State pre-empted from regulating engines < 175 hp. CAA section 209(e)(1)(A).

Other Information

Withdrawal of Arizona's Commitment to Adopt California Emissions Standards for Some Classes of Nonroad Engines

Arizona legislation allows ADEQ to adopt California's emission standards for six categories of off-road vehicles and engines:

1. Heavy Duty diesel vehicle rated at ≥ 175 horsepower (hp);
2. Small utility and lawn and garden equipment and engines rated at less than 25 hp;
3. Recreational vehicles rated at less than 25 hp;
4. Specialty engines and go-carts rated at greater than 25 hp;
5. Off-road motorcycles and all-terrain vehicles; and
6. Golf cart engines (Maricopa County only).

The MAG plan estimated that the directly-emitted PM-10 emission reductions for these standards would be 1.01 mtpd. MAG TSD, p. V-66. The bulk of these reductions would come from the controls on heavy duty diesel vehicles rated at greater or equal to 175 hp.

In October, 1996, we adopted emission standards for large diesel engines that are essentially identical to the CARB standards for these engines. See 63 FR 56968 and ADEQ Off-road Letter, Enclosure 3, Table 2. ADEQ calculated that these federal standards will reduce directly-emitted PM-10 by 0.85 mtpd in 2006 or 85 percent of the emission reductions attributed in total to all the CARB standards.

In order to adopt, implement, and enforce these balance of the CARB off-road standards, ADEQ would have to expend considerable resources, primarily because they would have to establish their own certification program for each of the engine/vehicle types they regulated. See ADEQ Off-road Letter. This level of expenditure is unwarranted given the very small reductions that would be achieved from the standards, 0.16 mtpd, and therefore, the measure is not applicable to the Phoenix area for that reason.

The MAG plan considered the CARB off-road standards to be a contingency measure for the annual standard, showing that the emission reductions from them were not needed for expeditious attainment or RFP. MAG plan, p. 8-17. As will be discussed later in this TSD in the section on contingency measures, the MAG plan continues to provide for the implementation of contingency measures consistent with the CAA and our policies without the State's commitment to adopt the CARB standards.

Attainment of the 24-hour standard does not depend on emission reductions from nonroad engine standards, therefore, withdrawal of the ADEQ commitment does not adversely

affect either the attainment or RFP demonstrations for that standard. See Microscale plan, pp. 17-19.

This section prepared by Roxanne Johnson and Frances Wicher.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR PAVED ROAD DUST

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including its technological feasibility, costs, and energy and environmental impacts where necessary, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State “demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area.” CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area as necessary, compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source

category, and provide for the adoption of any MSM that is more stringent than existing measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies paved road dust as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-1.

Description of Paved Road Dust Source Category

The paved road dust is fugitive dust that is deposited on a paved roadway and then is re-entrained into the air by the action of tires grinding on the roadway. Dust is deposited on the roadway from being blown onto the road from disturbed areas; tracked onto the road from unpaved shoulders, unpaved roads, or other unpaved access points; stirred up from unpaved shoulders by wind currents created from traffic movement; spilled onto the road by haul trucks; and carried onto the road by water runoff or erosion.

Emissions of paved road dust are proportional to vehicle miles traveled. Re-entrained road dust emission rates are not significantly affected by vehicle speed but are affected by the silt loading on the road and amount of vehicle travel on a road. Where unpaved shoulders exist, the volume of heavy-duty truck traffic can affect emissions in that the wind currents created from truck undercarriages can pick up more fugitive dust from shoulders than other vehicles. Emission rates are lower per mile traveled on more trafficked roads than they are on roads that receive less traffic.

Emissions from Paved Road Dust in the Phoenix Area

Paved road dust is one of the largest categories of PM-10 emissions in the inventory accounting for 56.4 metric tons per day or 39.1 percent of the total directly-emitted, non-windblown 1994 PM-10 inventory (1994 Regional Inventory, Table 2-3) and 20.4 percent of the 2006 pre-control total (including windblown) PM-10 inventory (MAG plan TSD, Table II-3). Total uncontrolled paved road dust emissions increase by almost 30 percent from 1995 to 2006 due to the increased vehicle miles traveled (VMT) between 1995 and 2006. (MAG plan TSD, Tables II-1 and II-3). The microscale analysis, however, shows that paved road dust is a very small contributor to 24-hour exceedances. Microscale plan, p. 17-19.

Track out from construction sites is also paved road dust but is treated as a separate inventory category in the MAG plan. Table PRD-1.

TABLE PRD-1 EMISSIONS FROM CONSTRUCTION TRACK OUT (AVERAGE ANNUAL DAY)		
		TRACK-OUT
1995 modeling year	mtpd	24.8
	percent of inventory	13
2006 projected year – uncontrolled	mtpd	27.6
	percent of inventory	13.9
Growth between 1995 and 2006		11%

Does the plan meet the statutory and policy requirements?

Suggested Measure List for BACM and MSM Analysis

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for paved road dust including potential most stringent measures from other States and provides information on their technological feasibility, costs, and energy and environmental impacts when appropriate.

The suggested measures for controlling emissions from paved road dust fall into one of three categories: reductions in VMT and VT, preventing deposition of material onto roadway, and cleaning material off roadways. We have already discussed measures for reducing VMT. Table PRD-2 describes the two other categories of control.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

Prior to the MAG plan, the cities and towns in the Phoenix area and Maricopa County have implemented a number measures addressing paved road dust. See MAG plan, Table 10-5. With the additional measures in the MAG plan (described below), the overall control program to reduce paved road dust is both strengthened and expanded beyond the existing program. See Table PRD-2. Both strengthening and expanding existing programs are key criteria for demonstrating the implementation of BACM. See *Addendum* at 42013. Where the MAG plan has rejected potential BACM, it provides a reasoned justification for the rejection. See Table PRD-2.

The MAG plan identifies a number of potentially most stringent measures for controlling paved road dust from other areas and has shown that they are either adopted or are not in fact more stringent than existing Phoenix area programs.

With the exception of the MSM for PM-10-efficient street sweepers, all the adopted BACM for paved roads were implemented by June 10, 2000, the BACM implementation deadline for the Phoenix area, or have on-going implementation schedules because they are part of a on-going capital improvement program. (e.g., curbing). See Table PRD-2. For the reasons discussed below, we propose to find that the MAG plan provides for the implementation of the PM-10 efficient street sweeper measures as expeditiously as practicable, consistent with our proposed MSM policy.

We, therefore, propose to find that the MAG plan provides for the implementation of RACM and BACM and for the inclusion of MSM for paved road dust.

There are three “regulatory” approaches for controlling paved road dust in the MAG plan:

1. MCESD regulation: both MCESD Rule 310 and Rule 310.01 have provisions addressing deposition of dirt onto paved road surfaces and clean up of dirt on paved road surfaces.⁵⁰
2. City and County commitments: many of the cities and towns of Maricopa County as well as the County itself have committed to reduce sources of dust that can be tracked onto paved road surfaces such as paving or stabilizing unpaved access points and unpaved shoulders and to sweep roads.
3. Arizona legislation: A.R.S. 9-500.04(3) and 49-474.01(4) added in S.B. 1427 (1998) requires Maricopa County cities, towns, and the County starting January 1, 2000 to develop and implement plans to stabilize unpaved roads, alleys and stabilize unpaved shoulders on targeted arterials. These plans must address the performances goals, the criteria for targeting the roads, alley and shoulders, a schedule for implementation, funding options, and reporting requirements.

Notwithstanding the requirements of Rule 310 and Rule 310.01 that apply county-wide, we note that the MAG plan shows that jurisdictions are implementing paved road measures to varying degrees, which can be attributed to differences in the type and extent of local sources and budgets. CAA requirements to implement BACM and include MSMs are a collective obligation of the nonattainment area and not of individual jurisdictions within that nonattainment area. Therefore, to judge whether the MAG plan provides for implementation of BACM and for the

⁵⁰ We proposed to approve Rules 301 and 310.01 into the SIP as part of our proposal on the annual standard. See 65 FR 19964, 19989.

inclusion of MSM, we have focused on the combined effect of local commitments on the region as whole rather than judging compliance jurisdiction by jurisdiction.

Moreover, because BACM and MSM are obligations of the nonattainment area, we do not judge one jurisdiction's efforts against another nor consider one jurisdiction's efforts to set a BACM or MSM standard that other jurisdictions must meet or provide a justification for not doing so. Just because one jurisdiction has adopted a measure does not compel the others under the BACM or MSM requirements to do the same.

TABLE PRD-2 ANALYSIS OF BACM AND MSM FOR PAVED-ROAD DUST			
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
SUGGESTED BACM			
Preventing deposition of material onto roadways	Paving, vegetating, and chemically stabilizing unpaved access points onto paved roads	Yes	See Note 1 below. Programs are generally implemented using existing personnel and City/Town/County general funds and/or state and federal transportation funds and program. Legal authority for Cities/Towns/County to maintain/improve roads in found in A.R.S. 9-240 and 11-251, respectively. City/Town/County commitments for capital improvements do not need a traditional enforcement program.
	Prevent trackout from construction/industrial sites	Yes	Rule 310, sections 308.2(c) and 308.3 address dirt trackout from construction/industrial sites: All work sites that are five acres or larger and all work sites where 100 cubic yards of bulk materials are hauled on-site or off-site each day must control and prevent trackout by installing a trackout control device. All work sites must also clean up spillage or trackout immediately when it extends a cumulative distance of 50 linear feet or more; where trackout extends less than 50 feet, it must be cleaned up at the end of the work day. See Note 2 below.
	Curbing, paving, or stabilizing shoulders on paved roads	Yes	See Note 3 below. Programs are generally implemented using existing personnel and City/Town/County general funds and/or state and federal transportation funds and program. Legal authority for Cities/Towns/County to maintain/improve roads in found in A.R.S. 9-240 and 11-251, respectively. City/Town/County commitments for capital improvements do not need a traditional enforcement program.
	Control of emissions due to material transport (truck covers, freeboard requirements)	Yes	Rule 310, sections 308.1 and 308.2 address material transport. When hauling material off-site onto paved public roadways, sources are required to: 1) load trucks such that the freeboard is not less than three inches; 2) prevent spillage; 3) cover trucks with a tarp or suitable enclosure; and 4) clean or cover the interior cargo compartment before leaving a site with an empty truck. See Note 4 below.

TABLE PRD-2 ANALYSIS OF BACM AND MSM FOR PAVED-ROAD DUST				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
	Storm water drainage to prevent water erosion onto paved roads	Yes		Rule 310.01, section 306 requires property owners/operators to remediate erosion-caused deposits of bulk materials onto paved surfaces. Erosion-caused deposits are to be removed within 24 hours of their identification or prior to resumption of traffic on the pavement. See note 5 below.
	Improved material specification for and reduction of usage of skid control sand or salt	No	Yes	Materials not used in the Phoenix area. MAG plan, p. 5-2.
Clean up material from roads	Control of emission due to material transport (clean up of spills)	Yes		Rule 310, section 308.2 and 308.3 address rapid clean up of track out from construction/industrial sites. Rule 310.01, section 306 requires property owners/operators to remediate erosion-caused deposits of bulk materials onto paved surfaces. Erosion-caused deposits are to be removed within 24 hours of their identification or prior to resumption of traffic on the pavement. See Note 4 below.
	Frequent routine sweeping or cleaning of paved roads	Yes		Programs are generally implemented using existing personnel and City/Town/County general funds. Legal authority for Cities/Towns/County to maintain/improve roads is found in A.R.S. 9-240 and 11-251, respectively. City/Town/County commitments for capital improvements do not need a traditional enforcement program. See Note 6 below.

TABLE PRD-2 ANALYSIS OF BACM AND MSM FOR PAVED-ROAD DUST				
TYPE OF CONTROL	SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
	Intensive street cleaning requirements for industrial paved roads and streets providing access to industrial/construction sites	Yes		Rule 310, sections 308.2(c) and 308.3 address dirt trackout from construction/industrial sites: When crossing a public roadway that is open to travel during construction, sources must install a suitable trackout control device (e.g. grizzly, wheel wash system, gravel pad, or paving). All work sites that are five acres or larger and all work sites where 100 cubic yards of bulk materials are hauled on-site or off-site each day must control and prevent trackout by installing a trackout control device. All work sites must also clean up spillage or trackout immediately when it extends a cumulative distance of 50 linear feet or more; where trackout extends less than 50 feet, it must be cleaned up at the end of the work day. See Note 2 below.
	Traffic rerouting or rapid clean up of temporary sources of dust on paved roads	Yes		Rule 310, section 308.2 and 308.3 address rapid clean up of track out from construction/industrial sites. Rule 310.01, section 306 requires property owners/operators to remediate erosion-caused deposits of bulk materials onto paved surfaces. Erosion-caused deposits are to be removed within 24 hours of their identification or prior to resumption of traffic on the pavement.
	Crack seal equipment	Yes		A.R.S. 9-500.04(4) and 49-474.01(3) requires Maricopa County city, towns, and the County to acquire or use vacuum systems or other dust removal technology to reduce particulate attributable to crack sealing operations as existing equipment is retired.
Most Stringent Measures				
	Limit procurement of street sweepers to PM-10 efficient units	No	Yes	The MAG plan commitment provides for the procurement of PM-10 efficient units but does not limit jurisdictional ability to procure non PM-10 efficient street sweepers. See Note 6 below.

* For information on resources for implementing Rules 310 and Rule 310.01, see TSD section “MCESD’s Commitments to Improve Compliance and Enforcement of the Fugitive Dust Program.” For information on legal authority for Rules 310 and Rule 310.01, see TSD section, “General SIP Requirements: Adequate Personnel, Funding, and Authority.” For information on the enforcement program for Rule 310 and Rule 310.01, see TSD section, “Description of the Enforcement Methods and State Back-Up Authority.”

Note 1 – Stabilizing Unpaved Access Points

In the MAG moderate area plan, local jurisdictions focused on requiring new connections to public paved streets to be paved. MAG plan, p. 9-74. In the serious area plan, the focus has shifted to addressing existing unpaved access points. Most public entities committed to stabilize unpaved access points when a connecting road is built, improved or reconstructed. See, for example, Glendale Commitment, “Reduce Particulate Emissions from Unpaved Shoulders and Unpaved Access Points on Paved Roads.” Some cities, such as Gilbert and Mesa, have made explicit commitments for stabilizing existing access points without this prerequisite.⁵¹ In any case, we anticipate that city/town/County road paving and stabilization projects will result in controlling a number of existing unpaved access points. These projects combined with increased enforcement of track-out restrictions and additional PM-10 efficient street sweeping efforts should reduce paved road emissions attributable to unpaved access points.

The MAG plan identifies stabilizing unpaved access points as one of the most expensive paved road dust controls per pound of emissions reduced. MAG plan, p. 9-19. This high cost effectiveness suggests that it is appropriate for jurisdictions to stabilize existing unpaved access points on a selective basis, in combination with other paved road measures, in order to maximize PM-10 emission reductions achievable with the available funding.

Note 2 - Most Stringent Measures for Trackout

The MAG plan identifies as a potentially most stringent measure for trackout South Coast Rule 403. MAG plan, Table 10-7. Rule 403 requires construction site sources to prevent or remove trackout onto public paved roadways within one hour or: 1) prevent and remove trackout that extends a cumulative distance of 50 feet or more onto any paved public road during active operations; 2) remove all visible roadway trackout onto paved public roads at the end of each work day when active operations cease; and 3) pave or chemically stabilize the point of intersection with public paved road surfaces and install a trackout control device (unless the paving/stabilization extends 100 feet and is 20 feet wide).

⁵¹ Gilbert commits to mill asphaltting all unpaved road access points with paved roads. Gilbert commitment, measure II. Mesa commits \$120,000 for stabilization of approximately 10 miles per year of all high priority unpaved shoulders and access points. Mesa commitment, measure 97-DC-8.

The MAG plan concludes that the two rules are reasonably similar in several respects, and where differences exist, the relative impacts on control roughly balance against each other. MSM Study, p. C-4. We agree that the trackout requirements in Maricopa County's Rule 310 are very similar to those in South Coast Rule 403. Both rules emphasize prevention and removal of trackout by requiring that trackout control devices be installed and/or equivalent measures taken and that trackout be removed from any worksites at the end of the day or sooner if the trackout extends more than 50 feet. Maricopa County's Rule 310 does not require trackout control devices for work sites less than 5 acres that haul less than 100 cubic feet of material; however, the Rule's strict trackout removal requirements still apply to such sites, so that the absence of a requirement for a trackout control device on smaller sites does not significantly affect the stringency of Rule 310 compared to Rule 403.

Note 3 – Unpaved Road Shoulders

In the MAG moderate area plan, local jurisdictions focused on preventing the creation of new unpaved road shoulders by requiring new and reconstructed roads to have curbs, gutters, and sidewalks. MAG plan, p. 9-77. In the serious area plan, the focus has shifted to addressing existing unpaved shoulders. Maricopa County has committed to treat 100 miles of shoulders along existing paved arterial and collector roadways with high volume truck traffic by 2003, in addition to its annual capital improvement projects for paving or treating unpaved shoulders. Maricopa County commitment, measure 1999 revised measure 5.

A.R.S. 9-500.04(3) and 49-474.01(4), adopted by the State legislature in 1998, require the cities, towns and County of Maricopa to develop and implement plans to stabilize targeted unpaved roads and alleys and to stabilize unpaved shoulders on targeted arterials beginning January 1, 2000. The legislation also allows the use of petroleum based or nonpetroleum based products in the maintenance and repair of shoulders.

Although this legislation does not specify how many shoulder miles are to be controlled, we believe that local jurisdictions' efforts to meet this new legislation will result in the control of unpaved shoulders where it is most needed. As with stabilizing unpaved access points, costs will be a factor in determining the extent to which unpaved shoulders are treated. The MAG plan shows that stabilizing shoulders is relatively more expensive than most other control strategies for paved roads. MAG plan, p. 9-18. Thus, it is appropriate for cities and towns to apply this measure selectively to paved roads with disturbed shoulders and/or that experience heavy traffic volumes.

Note 4 - MSM for Material Transport

The MAG plan identifies requirements for bulk material transport in Imperial County (California) Regulation VIII as a MSM. MAG plan, Table 10-7. Rule 310's requirements for bulk material transport/hauling are essentially the same as Imperial County's requirements.

Note 5 – MSM for Material Spillage, Erosion, or Accumulation

The MAG plan identifies South Coast Rule 1186 as a potentially most stringent measure for material spillage, erosion, and accumulation onto roadways. MAG plan, Table 10-7.

Rule 1186 establishes requirements for public entities to clean visible accumulations off public streets. Specifically, the rule requires owners/operators of paved public roads with 500 or more average daily trips (ADT) to begin street cleaning visible roadway accumulations (caused by erosion or haul truck spillage) that cover a contiguous area in excess of 200 square feet within 72 hours of notification. The accumulation is to be completely removed as soon as feasible, and if it is not removed within 10 days of notification, the owner/operator must notify the District and provide an estimated removal completion date.

This measure can be compared to Maricopa County's Rule 310.01's provision for removal of erosion-caused deposits. Rule 310.01's requirement covers more sources in that it applies to any paved road (public or private), whereas Rule 1186 applies strictly to public roads. Also, Rule 310.01 applies to any erosion-caused deposit that violates the rule's opacity standard, regardless of whether the deposit covers more than 200 contiguous square feet or exists on a road with less than 500 ADT. Finally, Rule 310.01 sources are required to comply within 24 hours of the deposit's identification or prior to the resumption of traffic on pavement, which is more stringent than the time frame allowed in Rule 1186.

The MAG plan also identifies requirements for spillage cleanup in Mojave Desert (San Bernadino, California) Air Quality Management District Rule 403 as a potential most stringent measure. The rule requires construction/demolition site owners/operators to clean up project-related spills on publicly maintained paved surfaces within 24 hours for projects 0.5 acre or greater. Rule 310, sections 308.2(c) and 308.3 require all work sites greater than 0.1 acres to clean up spillage or trackout immediately when it extends a cumulative distance of 50 linear feet or more; where trackout extends less than 50 feet, it must be cleaned up at the end of the work day. Rule 310 is clearly more stringent than Mojave Desert's Rule 403.

Note 6 - BACM and MSM for Street Sweeping

The MAG plan includes commitments by MAG, cities, towns and the County for the purchase and use of PM-10 efficient street sweepers. See MAG commitment, PM-10 Efficient Street Sweepers. This commitment involves the allocation of \$3.8 million in Congestion Mitigation and Air Quality (CMAQ) funds for the FY 2000-2004 Transportation Improvement Program (TIP) to purchase PM-10 certified street sweepers for the local jurisdictions to use.⁵²

⁵² CMAQ funds are federal transportation funds awarded to certain nonattainment areas for congestion management and or air quality-transportation projects such as paving unpaved roads.

MAG has recommended an additional \$1.9 million in CMAQ funds be allocated to purchase PM-10 certified street sweepers in the FY 2001-2005 TIP. See MAG commitment, PM-10 Efficient Street Sweepers.

The funds allocated by MAG for this program should be sufficient to replace approximately two-thirds of the 72 existing city/town/County street sweepers.⁵³ Each fiscal year in which CMAQ funds are allocated for street sweepers, MAG will solicit requests for funding from cities, towns and the County in the PM-10 nonattainment area. Funding requests must identify by facility type (i.e. freeway, arterial/collector, local) the number of centerline miles to be swept with the PM-10 certified units, expected frequency of sweeping and average daily traffic (if available). MAG will use this information to estimate the emissions reduction associated with each sweeper request and rank the requests in priority order of effectiveness for consideration in the allocation of CMAQ funds.

In evaluating this program, we consider not only the number of PM-10 efficient street sweepers to be purchased and distributed, but whether the program incorporates use factors that influence emissions reductions. The greatest emissions reduction benefit for this mitigative measure will be achieved if the sweepers are used on a frequent basis on roads with high silt loadings or significant visible accumulations. Each public entity has a monetary incentive to compete for the PM-10 efficient street sweepers, as the program is funded by MAG with a low cost share requirement.⁵⁴ Also, the new street sweepers will either replace existing city-owned street sweeping equipment or contracted out services, or be added to existing street sweeper equipment/services. MAG's selection process includes PM-10 emissions reduction potential, based on the types of roads each jurisdiction is targeting for sweeping and how frequently they will be swept.⁵⁵ This data will assist MAG in distributing the street sweepers to local jurisdictions in a way that maximizes the regional air quality benefits of the program. In addition, when the cities/towns/County are awarded PM-10 efficient street sweepers, their submittals will that incorporate use factors that maximize emission reductions from this measure

Most cities/towns and the County have ongoing street sweeping programs with variable sweeping frequencies. With some exceptions, public entities implementing this measure have not explicitly committed to increase their existing sweeping frequencies.⁵⁶ However, sweeping

⁵³ Some street sweepers may be additions to, as opposed to replacements of, existing equipment.

⁵⁴ The required cost share for local jurisdictions is 5.7 percent.

⁵⁵ See MAG, "Methodology for Evaluating Congestion Mitigation and Air Quality Improvement Projects," Draft Revised, June 21, 2001, pp. 18 - 22.

⁵⁶ Phoenix approved a program in 1996 to increase the frequency of residential street sweeping to match the uncontained trash pick-up schedule (\$656,000 estimated budget).

frequency is appropriately evaluated in combination with other paved road measures, because the emission-reducing potential of increased sweeping frequency is closely associated with other factors. These factors include whether the sweepers currently in use are PM-10 efficient (such that the act of sweeping does not cause increased emissions) and whether the public entity has identified roads that tend to experience higher silt loadings where more frequent sweeping is likely to make an appreciable difference in PM-10 emissions. Sweeping frequency is among the criteria included in MAG's PM-10 efficient street sweeper solicitation and thus we believe this measure is largely incorporated into MAG's new program.

We believe that implementation of the PM-10 efficient street sweeper program is as expeditious as practicable. Funding for purchasing this equipment is allocated on a fiscal year basis and it will take several years for sufficient funds to be available to purchase enough equipment to replace or add to the current street sweeping equipment.

The MAG plan identifies as a potential MSM the PM-10 efficient street sweeping provisions in South Coast Rule 1186. MAG plan, Table 10-7. However, the plan's analysis pre-dates MAG's commitment for the purchase and distribution of PM-10 efficient street sweepers and is no longer current.

Rule 1186 requires any government or government agency which contracts to acquire street sweeping equipment or services for routine street sweeping on public roads that it owns and/or maintains, where the contract date or purchase or lease date is January 1, 2000 or later, to acquire or use only certified street sweeping equipment. The rule establishes street sweeper testing and certification procedures. Unlike Maricopa's strategy, Rule 1186 requires that PM-10 efficient street sweepers be used whenever street sweeping is contracted out as of January 2000, and it requires public agencies to replace their street sweeping equipment when it is retired with PM-10 efficient equipment. .

MAG's PM-10 efficient street sweeper program is being funded over the next 4 to 5 fiscal years, which may result in a greater number of street sweepers distributed in a shorter time frame than could be expected using South Coast's natural attrition approach. While it is possible that some cities/towns in Maricopa may continue to contract out for street sweeping services where PM-10 efficient sweepers may not be used, most do not contract for street sweeping.⁵⁷

Phoenix commitment, measure 97-DC-5. Tolleson committed to increase the frequency of street sweeping on 15.3 miles of road, and include vacuuming in addition to sweeping. Tolleson commitment, measure 97-DC-5.

⁵⁷ El Mirage and Queen Creek appear to be the only cities/towns that fully rely on contracted out street sweeper services. Avondale, Goodyear, Mesa, Youngtown and Arizona Department of Transportation indicate that they own at least one street sweeper and contract out some additional services.

Furthermore, due to the fact that public entities will be competing for PM-10 efficient street sweepers funded by CMAQ dollars with only a low cost share requirement, we believe that the already limited reliance on contracted out services in Maricopa County will be reduced even more as new PM-10 efficient equipment becomes available and that contractors will switch to PM-10 efficient equipment to meet new demand. In addition, MAG's program ensures that the cities/town/County develop plans for how the street sweepers will be used to maximize their emissions reduction potential. We therefore believe that overall the Maricopa program is equivalent to South Coast Rule 1186.

This section prepared by Karen Irwin.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR UNPAVED PARKING LOTS

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including its technological feasibility, costs, and energy and environmental impacts as necessary, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State “demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area.” CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area as necessary, compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source category, and provide for the adoption of any most stringent measures and provide for

implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies unpaved parking lots as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-9

Description of Unpaved Parking Lot Source Category

This category includes emissions from re-entrained road dust from vehicle traffic in unpaved parking lots and windblown dust entrained from the disturbed surface of unpaved parking lots. MAG TSD, Appendix II, Exhibit 6, Attachment 3, "Documentation of Calculations of Emissions from Unpaved Parking Lots"

Emissions from Unpaved Parking Lots in the Phoenix Area

Emissions from unpaved parking lots are not in a separate category in the 1994 base year emissions inventory but are included in the disturbed vacant land category.

Emissions from unpaved parking lots were calculated for the 1995 base year modeling inventory. Based on information gathered as part of the microscale study, 24 percent of disturbed vacant land is actually unpaved parking lots. MAG TSD, p. V-17. Based on the same study, more than 99 percent of unpaved parking is comprised of lots greater than or equal to 5000 square feet. MAG TSD, p. V-17. Emission estimates for traffic on unpaved parking lots in 1995 are 5.3 mtpd. MAG TSD, Appendix II, Exhibit 6, Attachment 3, p. 2. Windblown emissions are estimated to be 0.8 mtpd.⁵⁸ The plan assumes no growth of unpaved parking lot emissions due to city ordinances requiring paving of any new parking lots.

Does the plan meet the statutory and policy requirements?

Existing Controls

The MAG plan includes two rules that address unpaved parking lots. MCESD Rule 310.01 (formerly Rule 310) establishes requirements to stabilize unpaved parking lots over 5000 square feet. Section 303. Rule 310 applies to unpaved parking lots over 5000 square feet located

⁵⁸ Calculated at 24 percent of the windblown dust from disturbed vacant land: 1,186 mtpy x 0.24 /365. MAG TSD, Table II-3.

at permitted facilities (including construction sites).⁵⁹ Section 302.1. Rule 310 and Rule 310.01 requirements apply to both publicly and privately owned lots.

In 1998, we promulgated a federal fugitive dust rule as part of our federal implementation plan (FIP) for Phoenix. 63 FR 41326. This rule establishes RACM for nonpermitted unpaved parking lots, among other sources. See 40 CFR 52.128(d)(3). We subsequently made revisions to the Phoenix FIP rule and the final version was published on December 21, 1999. See 64 FR 71304. The FIP rule establishes requirements to stabilize unpaved parking lots over 5000 square feet.

Suggested Measure List for BACM and MSM Analysis

There are two principal ways to control emissions from unpaved parking lots: prohibit new unpaved parking lots or treat existing lots. The MAG plan identified both: a prohibition on unpaved haul roads and parking or staging areas and surface treatment to reduce dust from unpaved driveways and parking lots. MAG plan, Table 5-2 (measures 136 & 137).

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for unpaved parking lots as well as provides information on their technological feasibility, costs, and energy and environmental impacts when appropriate. The MAG plan only identified a one potentially most stringent measure from South Coast which controls fugitive dust from parking areas on construction sites. MSM Study, p. C-9 and 10. It did not identify any potential MSM for non-construction site unpaved parking lots.

See Table UPL-1.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

For the reasons discussed below, we believe that MAG plan provides for the implementation of RACM and BACM and includes the MSM for unpaved parking lots. All the plan's measures for unpaved parking lots were implemented by June 10, 2000, the BACM implementation deadline for the Phoenix area. See Table UPL-1.

1. RACM and BACM

In determining whether the MAG plan provides for the implementation of BACM for unpaved parking lots, we are first specifically considering whether the plan provides for the

⁵⁹ Permitted sources include any facility permitted by MCESD and is not limited solely to those facilities with earthmoving permits. Rule 310, section 102.

implementation of RACM for these sources.⁶⁰ In our FIP, we promulgated a RACM fugitive dust rule applicable to unpaved parking lots in the Phoenix PM-10 nonattainment area. 40 CFR 52.128(d)(3). This rule provides a starting point for determining whether the MAG plan measures for unpaved parking lots meet RACM. It is not necessary for the MAG plan measures to be identical to the FIP rule in order to meet the CAA's RACM requirements, but only that they provide for the implementation of RACM. However, if the submitted measures for a particular source are identical to the FIP rule, we can determine without further analysis that the MAG plan has provided for RACM for that source.

The FIP rule RACM requirements for unpaved parking lots are as follows:

- Owners/operators of an unpaved parking lot larger than 5,000 square feet are required to pave, apply dust suppressants, or apply gravel, according to the applicable rule standards/test methods. Applicable standards include a 20 percent opacity standard, and an 8 percent silt content standard and/or a 0.33 oz/square foot silt loading standard. Unpaved parking lots that are used no more than 35 days a year, excluding days when ten or fewer vehicles enter, are only required to implement controls on days when over 100 vehicles enter and park.

MCESD requirements for unpaved parking lots are found in Rule 310.01, section 303. See Table UPL-1. Rule 310.01 contains the same requirements in terms of source coverage and applicable standards/test methods for unpaved parking lots as the FIP rule, with the only difference being that Rule 310.01 applies county-wide while the FIP rule applies strictly to sources located in the PM-10 nonattainment area. Rule 310.01 requirements are effective upon

⁶⁰ While a serious area PM-10 plan must provide for both the implementation of RACM (to the extent that it has not already satisfied the requirement in its moderate area plan) and BACM, in determining whether such a plan provides for BACM implementation, we do not normally conduct a separate evaluation to determine if the measures also meet the RACM requirements of the CAA as interpreted by EPA in its *General Preamble*. See 57 FR 13540. This is because in our serious area guidance (*Addendum* at 42010), we interpret the BACM requirement, as generally subsuming the RACM requirement (i.e., if we determine that the measures are indeed the "best available," we have necessarily concluded that they are "reasonably available"). See *Addendum* at 42012-42014. Therefore, a separate analysis to determine if the measures also represent a RACM-level of control is not generally necessary. However, in this particular case, we have already established through our FIP rule what we consider to be a RACM-level of control for this source category. Thus our FIP rule provides us with a baseline against which we can review whether the MAG plan provides not only for RACM but also goes beyond that for BACM. We also intend to eventually withdraw the FIP rule in favor of local controls. In order to do this, we must determine under CAA section 110(l), that, among other things, withdrawing the FIP rule does not interfere with the RACM requirements in the CAA. An explicit determination now simplifies this future action.

adoption and were adopted on February 2000, such that the timeframe for controls is equivalent to the FIP rule and is also as expeditious as practicable.

In addition to Rule 310.01 requirements, many cities/towns stated that they had treated their own parking lots or required treatment of private lots below MCESD's thresholds. See Table UPL-2. Table UPL-2 shows that jurisdictions are implementing unpaved parking lot measures to varying degrees, which can be attributed to differences in the type and extent of local sources and budgets. CAA requirements to implement BACM and include MSMs are a collective obligation of the nonattainment area and not of individual jurisdictions within that nonattainment area. Therefore, to judge whether the MAG plan provides for implementation of BACM and for the inclusion of MSM, we have focused on the combined effect of local commitments on the region as whole rather than judging compliance jurisdiction by jurisdiction.

Moreover, because BACM and MSM are obligations of the nonattainment area, we do not judge one jurisdiction's efforts against another nor consider one jurisdiction's efforts to set a BACM or MSM standard that other jurisdictions must meet or provide a justification for not doing so. Just because one jurisdiction has adopted a measure does not compel the others under the BACM or MSM requirements to do the same.

In light of the fact that Rule 310.01 requirements are the same as the FIP rule requirements, we propose that the MAG plan meets RACM. Given additional MAG plan city/town commitments that collectively increase the stringency of control on unpaved parking lots, we propose that the MAG plan also meets BACM. Rule 310.01 required compliance prior to June 10, 2000 and the city and town commitments were all implemented prior to June 10, 2000, therefore, BACM for unpaved parking lots was implemented prior to the June 10, 2000 BACM implementation deadline for the Phoenix area.

2. Most Stringent Measure

South Coast Rule 403 requires sources to apply dust suppressants to stabilize at least 80 percent of unstabilized surface area at construction sites and comply with a 0 percent opacity property line limit. The MAG plan deems the respective requirements roughly equivalent to Rule 310. MAG plan, p. 10-29. We believe that the addition of a silt loading/content standard for unpaved parking lots for sources covered under Rule 310 increases the rule's stringency to be at least equivalent to that of South Coast Rule 403.

The MAG plan did not identify potential MSMs for unpaved parking lots that are not associated with construction sites (i.e. sources subject to Rule 310.01). As mentioned above, the federal fugitive dust rule establishes requirements to stabilize unpaved parking lots over 5000 square feet in Maricopa County. The Rule 310.01 requirements for unpaved parking lots are virtually identical to those of the federal fugitive dust rule. In addition, some city/town ordinances are more stringent than Rule 310.01 requirements.

TABLE UPL-1		
ANALYSIS OF BACM AND MSM FOR UNPAVED PARKING LOTS		
SUGGESTED MEASURE	ADOPTED? IF NO, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
BACM		
Prohibit unpaved parking lots	Yes	Most cities identified ordinances that require paving of new parking lots. See Table UPL-2. Programs are generally implemented using existing personnel and City/Town/County general funds. Legal authority for Cities/Towns/County to require new parking lots be paved is in found in A.R.S. 9-240 and 11-251, respectively. Ordinances are enforced through building permits and code. See MAG Plan, pp, 7-111 to 7-127.
Treat unpaved parking lots	Yes	MCESD Rule 310.01 requires owners/operators of an unpaved parking lot larger than 5,000 square feet to pave, apply dust suppressants, or apply gravel, according to the applicable rule standards/test methods. Section 303. Applicable standards include a 20% opacity standard, and an 8% silt content standard and/or a 0.33 oz/square foot silt loading standard. Section 303.2. Unpaved parking lots that are used no more than 35 days a year, excluding days when ten or fewer vehicles enter, are only required to implement controls on days when over 100 vehicles enter and park. Section 303. MCESD Rule 310 applies the same stabilization requirements to parking lots. Rule 310, section 302.1. Many cities/towns stated that they had treated their own parking lots or required treatment of private lots below MCESD's thresholds. See UPL-2.

* For information on resources for implementing Rules 310 and Rule 310.01, see TSD section "MCESD's Commitments to Improve Compliance and Enforcement of the Fugitive Dust Program." For information on legal authority for Rules 310 and Rule 310.01, see TSD section, "General SIP Requirements: Adequate Personnel, Funding, and Authority." For information on the enforcement program for Rule 310 and Rule 310.01, see TSD section, "Description of the Enforcement Methods and State Back-Up Authority."

TABLE UPL-2		
CITY COMMITMENTS FOR UNPAVED PARKING LOTS		
CITY OR TOWN	NEW LOTS	EXISTING LOTS
Avondale Measure 98-DC-9	No information provided in plan.	Notified all owners of unpaved parking lots that they must pave their lots by September 10, 1999
Carefree Measure 98-DC-9	Zoning ordinance requires all new parking lots to be paved.	All unpaved parking lots are graveled.

TABLE UPL-2 CITY COMMITMENTS FOR UNPAVED PARKING LOTS		
CITY OR TOWN	NEW LOTS	EXISTING LOTS
Chandler Measure 98-DC-9	City ordinance requires all parking areas to have a paved or dust free surface regardless of size.	City ordinance requires all parking areas to have a paved or dust free surface regardless of size.
El Mirage Measure "Reduce Particulate Emissions from Unpaved Parking Lots"	Zoning ordinance requires all new parking lots to be paved with materials suitable to control dust.	All high use parking lots are paved.
Fountain Hills Measure 98-DC-9	Zoning ordinance requires all new parking lots to be paved.	City will pave or stabilize all town-owned parking lots.
Gilbert Measure 98-DC-9	City ordinance requires paving or dust proofing all unpaved parking lots containing 5 parking spaces or greater than 2000 sq ft.	City ordinance requires paving or dust proofing all unpaved parking lots containing 5 parking spaces or greater than 2000 sq ft.
Glendale Measure 98-DC-9	Zoning ordinance requires all new parking lots to be paved.	Not addressed.
Goodyear Measure 98-DC-9	No information provided in plan.	Notified all owners of unpaved parking lots that they must pave their lots by April, 1999.
Mesa Measure 97-DC-9	No information provided in plan. (Zoning code requires new parking lots to be paved.)	Public lots are paved. City ordinance requires improved dustproof parking surface at residences and commercial sites.
Paradise Valley Measure 98-DC-9	City ordinance requires all parking lots be paved. City will adopt an ordinance that would require any new unpaved parking, if approved, to be improved and maintained per MAG standards.	City ordinance requires all parking lots be paved.
Peoria Measure 98-DC-9	No information provided in plan.	Notified all owners of unpaved parking lots that they must pave their lots by April, 1999.
Phoenix Measure 97-DC-9b	City requires paving of commercial, industrial, and multi-family parking lots with 3 or more parking spaces and gravel or other dust-free parking for single family and duplex homes with 3 or more spaces.	City requires paving of commercial, industrial, and multi-family parking lots with 3 or more parking spaces and gravel or other dust-free parking for single family and duplex homes with 3 or more spaces.

TABLE UPL-2 CITY COMMITMENTS FOR UNPAVED PARKING LOTS		
CITY OR TOWN	NEW LOTS	EXISTING LOTS
Queen Creek Measure "Reduce Particulate Emissions from Unpaved Parking Lots"	No information provided in plan.	City does not have any public, commercial or residential parking lots.
Scottsdale "Dustproof Commercial and Residential Lots to Reduce Particulate Emissions from Unpaved Parking Lots"	City ordinance requires paving/dustproofing of all new parking lots.	City code requires that any applicant for renovation, expansion or improvement of an existing commercial or multi-family residential property shall pave or dustproof parking lots designed for the parking of 6 or more motor vehicles.
Surprise Measure "Reduce Particulate Emissions from Unpaved Parking Lots"	Zoning ordinance requires all new parking lots shall be paved with materials suitable to control dust.	All high-use city-owned parking lots are paved. There are no existing high use unpaved commercial parking lots.
Tempe Measure 98-DC-9	Not addressed in plan.	Zoning ordinance requires all commercial/residential parking lots shall be dustproofed.
Tolleson Measure 98-DC-9	City ordinance requires paving of all new parking lots.	City ordinance prohibits parking on any lot or area which is not dust free.
Youngtown Measure 98-DC-9	City ordinance requires paving of all new parking lots.	Town ordinance specifies the type of surface on which a motor vehicle must be parked.
Maricopa County Measure 97-DC-9	Not addressed in plan.	Rules 310/310.01

Programs are generally implemented using existing personnel and City/Town/County general funds and/or state and federal transportation funds and program. Legal authority for Cities/Towns/County to maintain/improve roads in found in A.R.S. 9-240 and 11-251, respectively. City/Town/County commitments for capital improvements are not regulatory programs and do not need a traditional enforcement program.

This section prepared by Karen Irwin

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR DISTURBED VACANT LAND

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including the measure's technological feasibility, costs, and energy and environmental impacts as needed, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State "demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area." CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area as necessary, compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source category, and provide for the adoption of any MSM that is more stringent than existing measures

and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies disturbed vacant land as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-1.

Description of Disturbed Vacant Land Source Category

This category includes windblown fugitive dust emissions from disturbed surfaces of vacant lands. On vacant land, fugitive dust emissions are caused by virtually any activity which disturbs an otherwise naturally stable parcel of land, including earthmoving activities, material dumping, weed abatement, and vehicle traffic. 63 FR 15919, 15937 (April 1, 1998)

Emissions from Disturbed Vacant Lands in the Phoenix Area

Emissions from disturbed vacant lands were calculated for the 1995 base year modeling inventory. There were an estimated 33,000 acres of vacant lands in the Maricopa nonattainment area in 1995. MAG TSD, Appendix II, Exhibit 7 (High Wind Inventory). Total annual emissions estimated for this category are 1391 mtpy. MAG TSD, Table II-2. However, based on information gathered as part of the microscale study, 24 percent of disturbed vacant land is actually unpaved parking lots, so only 1057 mtpy are due to disturbing actual vacant land. MAG TSD, p. V-17. Emissions from disturbed vacant lands are expected to decrease to 901 mtpy in 2006 due to development on vacant lands. MAG TSD, Table II-3 (76 percent of the emissions from disturbed vacant lands).

Does the plan meet the statutory and policy requirements?

Existing Controls

The MAG plan includes two MCESD rules that address vacant lots. Rule 310 requirements apply to vacant lots located at permitted facilities (including construction sites) and Rule 310.01 requirements apply to nonpermitted sources.⁶¹ Rule 310 and Rule 310.01 requirements apply to both publicly and privately owned lots. Rule 310, section 302.3 and Rule 310.01, sections 301 and 302.

⁶¹ Permitted sources include any facility permitted by MCESD and is not limited solely to those facilities with earthmoving permits. Rule 310, section 102.

In 1998, we promulgated a federal fugitive dust rule as part of our federal implementation plan (FIP) for Phoenix. 63 FR 41326. This rule establishes RACM for nonpermitted vacant lots and open areas, among other sources. See 40 CFR 52.128(d)(3). We subsequently made revisions to the Phoenix FIP rule and the final version was published on December 21, 1999. See 64 FR 71304. The federal fugitive dust rule establishes requirements to prevent motor vehicle disturbance on vacant lots and for stabilization of disturbed vacant lots.

Suggested Measure List for BACM and MSM Analysis

The MAG plan includes three suggested measures for controlling fugitive dust from vacant disturbed lands. The plan also identified controls on weed abatement operations as a potential most stringent measure. See Table DVL-1

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for vacant disturbed land including potential most stringent measures from other States as well as provides information on their technological feasibility, costs, and energy and environmental impacts when appropriate.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

For the reasons discussed below, we propose to find that the MAG plan provides for the implementation of RACM and BACM and for the inclusion of MSM for disturbed vacant lands. All the adopted measures for disturbed vacant lands were implemented by June 10, 2000, the BACM implementation deadline for the Phoenix area. See Table DVL-1.

1. RACM and BACM

In determining whether the MAG plan provides for the implementation of BACM for disturbed vacant land, we are also considering whether the plan provides for the implementation of RACM for these sources. See Footnote 60. In our FIP, we promulgated a RACM fugitive dust rule applicable to disturbed vacant land in the Phoenix PM-10 nonattainment area. This rule provides a starting point for determining whether the MAG plan measures for disturbed vacant lands meet RACM. It is not necessary for the MAG plan measures to be identical to the FIP rule in order to meet the CAA's RACM requirement, but only that they provide for implementation of RACM. However, if the submitted measures for a particular source are identical to the FIP rule, we can determine without further analysis that the MAG plan has provided for RACM for that source.

The FIP rule's requirements for vacant lots and open areas are as follows:

- Owners/operators of vacant lots and open areas ≥ 0.10 acres that are driven over/used by motor vehicles and/or off-road motor vehicles are required to prevent trespass by installing barriers or other effective measures. Alternatively, owners/operators may

choose to uniformly apply and maintain surface gravel or chemical/organic stabilizers to all disturbed areas in compliance with one of the rule's applicable stabilization standards/test methods. The rule allows a 60 day period for compliance following initial discovery of vehicle activity on the vacant lot/open area.

- Owners/operators of vacant lots and open areas with ≥ 0.5 acres of disturbed surface area that remain vacant or unused for more than 15 days are required to implement one or more control methods to stabilize the surface, according to the applicable standards/test methods. Control methods include establishing groundcover vegetation, applying dust suppressants (including water), restoring to a natural state, applying surface gravel, or implementing an alternative control methods. The rule allows a 60 day period for compliance following initial discovery of the disturbance on the vacant lot/open area.
- Anyone who conducts weed abatement and disturbs ≥ 0.5 acres on a vacant lot or open area is required to: 1) apply a dust suppressant(s) to the total surface area subject to disturbance immediately prior to or during the weed abatement; 2) prevent or eliminate material track-out onto paved surfaces and access points adjoining paved surfaces; and 3) apply a dust suppressant(s), gravel, compaction or alternative control methods immediately following weed abatement to the entire disturbed surface area such that it is stabilized according to the one or more of the applicable standards/test methods.⁶²

MCESD Rule 310.01 (formerly Rule 310) establishes requirements to prevent motor vehicle disturbance on vacant lots, and for stabilization of disturbed vacant lots. Sections 301 and 302. Rule 310 establishes requirements for disturbed vacant lots and open areas on permitted sources. Rule 310 also applies to and weed abatement operations that disturb ≥ 0.1 acre. Rule 310, section 308.8, establishes work practice requirements for weed abatement by blading or discing, including weed abatement that occurs on vacant lots. See Table DVL-1. MCESD has included the weed abatement requirements into Rule 310 rather than Rule 310.01 because weed abatement operations are subject to permits and Rule 310 applies to permitted sources.

In comparing Rule 310.01 requirements for vacant lots and open areas to the relevant FIP rule requirements, the two rules are virtually the same in terms of source coverage and stringency.⁶³ We address below minor differences between the two rules:

- Rule 310.01 includes a statement that clarifies the rule applies to any open area or vacant lot that is not defined as agricultural land and is not used for agricultural purposes

⁶² The FIP rule exempts weed abatement conducted by mowing or cutting where the weed stubble is maintained at least three inches above the soil surface.

⁶³ The same standards and test methods apply.

according to A.R.S. 42-12151 and 42-12152. These statutes respectively define agricultural land and property that is in active, as opposed to inactive, production. Thus, if for tax purposes, a vacant lot or open area reverts from classification as agricultural property under Arizona law to non-agricultural property, it is subject to Rule 310.01 requirements. This clarification improves upon the FIP rule for questions concerning rule applicability.

- Aside from the fact that Rule 310.01 applies to sources county-wide,⁶⁴ the definition of open areas and vacant lots in Rule 310.01 is more inclusive of sources than the Phoenix FIP rule. Unlike the FIP rule, Rule 310.01's (section 211) definition includes: 1) partially developed residential, industrial, institutional, governmental, or commercial lots; and 2) any tract of land, in the nonattainment area, adjoining agricultural property. Furthermore, Rule 310.01 clarifies that vacant portions of residential or commercial lots that are immediately adjacent and owned and/or operated by the same individual or entity are to be considered one vacant open area or lot. These provisions increase the number of vacant lots subject to Rule 310.01 beyond that of the FIP rule.
- Appendix C, Table 1, which lists threshold friction velocity values for determination of vacant lot/open area stability, includes a value of 135 cm/s associated with Tyler Sieve No. 5. The Phoenix FIP rule lacks a specific value. This better enables test method results to be appropriately averaged when the largest volume of material for one or more soil samples is captured in Tyler Sieve No. 5.
- Rule 310.01 exempts vacant lots/open areas from requirements for preventing motor vehicle use that have < 500 cumulative square feet of disturbed surface area. The FIP rule does not contain this exemption. However, the threshold for exempted sources is low⁶⁵ and is intended to spare owners/operators from rule requirements when trespass by motor vehicles is minimal. We believe this minor exemption does not have a significant impact on the emission reductions potential of Rule 310.01 and therefore does not impact our proposed determination that Rule 310.01 meets RACM. Further note that Rule 310.01 applies to more vacant lots than the FIP rule (as discussed above in the 2nd bullet), which helps offset any slight difference in coverage between the two rules.
- Rule 310.01 provides that, if vegetation is the chosen control method to stabilize open areas and vacant lots, the owner/operator has eight months to achieve stabilization, provided that vegetative ground cover is established within 60 days of initial discovery of the disturbance and that it is maintained and reapplied, if necessary, to achieve

⁶⁴ The FIP rule applies strictly to vacant lots in the PM-10 nonattainment area (located in the eastern third of the County).

⁶⁵ For added perspective, a 0.1 acre lot is 4,356 square feet.

stabilization. The Phoenix FIP rule contains a 60 day compliance period, as opposed to an eight-month compliance period. Compared to the FIP rule, however, Rule 310.01 does not alter the timeframe when an owner/operator is required to *begin* implementing a control(s). MCESD's eight-month allowance simply acknowledge that a longer time frame may be needed for vegetation growth to occur to an extent that complies with the rule's vegetation standard(s) for stabilization. This issue concerns the logistics of applying vegetation as RACM in the Phoenix PM-10 nonattainment area, and we find MCESD's argument reasonable for allowing a longer time frame to complete this RACM.

- Rule 310.01 provides that, if restoration to undisturbed native conditions is the chosen control method to stabilize open areas and vacant lots, the owner/operator has eight months to achieve stabilization, provided that restoration by the owner/operator begin within 60 days of initial discovery of the disturbance and be maintained and reapplied, if necessary, to achieve stabilization. The Phoenix FIP rule contains a 60 day compliance period. See previous comment.⁶⁶

Rule 310.01 requirements are effective upon adoption and the rule was adopted in February 2000. Therefore, the timeframe for controls is equivalent to the FIP rule.

For purposes of comparing Rule 310, section 308.8 weed abatement requirements to the FIP rule requirements for weed abatement on vacant lots and open areas, the following summarizes Rule 310 requirements for weed abatement. Rule 310 requires that the following measures be implemented when ≥ 0.1 acres are disturbed through weed abatement by discing or blading.⁶⁷

- apply water before weed abatement by discing or blading occurs; and
- apply water while weed abatement by discing or blading is occurring; and
- pave, apply gravel, apply water, apply a suitable dust suppressant, or establish vegetative ground cover, in compliance with at least one of the applicable standards/test methods, after weed abatement by discing or blading occurs.

The main difference between the FIP rule's weed abatement requirements and those of Rule 310 is that material trackout is not discussed in Rule 310, section 308.8 as a specific weed abatement requirement. However, weed abatement operations must comply with the trackout requirements found in Rule 310, section 308.3. Section 308.3 requires that trackout be prevented

⁶⁶ Similar reasoning applies to restoring disturbed land to its undisturbed native conditions.

⁶⁷ Owners/operators must also submit a dust control plan and gain approval of it by MCESD.

by installing a trackout control device at work sites with a disturbed surface area of five acres or larger. For all work sites, trackout must be cleaned up immediately when it extends a cumulative distance of 50 linear feet or more, or at the end of the work day if it extends less than 50 feet.

Rule 310 requirements are effective upon adoption and the rule was adopted in February 2000. Therefore, the timeframe for controls is equivalent to the FIP rule.

For reasons discussed above, we propose that the MAG plan requirements in Rule 310.01 and Rule 310 meet RACM for vacant lots currently subject to the FIP rule.

With respect to evaluating BACM for nonpermitted vacant lots, we consider the stringency of Rule 310.01 and other MAG plan commitments from cities/towns. As discussed above, Rule 310.01 applies to more sources than the Phoenix FIP rule (to provide a RACM comparison). The MAG plan contains several commitments made by several cities and towns to address vacant disturbed lots. For example, seven (7) jurisdictions require or will require stabilization of disturbed vacant lots after 15 days of inactivity (as compared to Rule 310.01's 60-day compliance period); two (2) prohibit dumping of materials on vacant land; and two (2) will stabilize all city-owned vacant lots. Most notably, Phoenix has funded a program to identify and stabilize City-owned vacant lots and Peoria has targeted 17 commercial lots and large tracts of desert for access and dust control. Phoenix commitment, measure 98-DC-10 and Peoria commitment, measure 98-DC-10.

Local jurisdictions are implementing disturbed vacant lot measures to varying degrees, which can be attributed to differences in the type and extent of local sources and budgets. CAA requirements to implement BACM and include MSMs are a collective obligation of the nonattainment area and not of individual jurisdictions within that nonattainment area. Therefore, to judge whether the MAG plan provides for implementation of BACM and for the inclusion of MSM, we have focused on the combined effect of local commitments on the region as whole rather than judging compliance jurisdiction by jurisdiction.

Moreover, because BACM and MSM are obligations of the nonattainment area, we do not judge one jurisdiction's efforts against another nor consider one jurisdiction's efforts to set a BACM or MSM standard that other jurisdictions must meet or provide a justification for not doing so. Just because one jurisdiction has adopted a measure does not compel the others under the BACM or MSM requirements to do the same.

With respect to evaluating BACM for vacant lots associated with permitted sources, Rule 310 requirements for vacant lots and open areas are more stringent than those in Rule 310.01, in that Rule 310 requires stabilization of all inactive disturbed surface areas on permitted facilities, regardless of their size. Rule 310, section 302.3. Rule 310 also contains requirements for weed abatement that closely resemble the Phoenix FIP rule's weed abatement requirements, except

that, as discussed above, Rule 310's threshold for coverage is more stringent.⁶⁸ Vacant lots and open areas subject to Rule 310 are required to meet the same surface stabilization standards/test methods as required in the Phoenix FIP rule.

Based on our analysis of the MAG plan, we propose to find that Rule 310 and Rule 310.01 requirements for disturbed vacant lots and open areas, in addition to commitments from the cities and towns which, in some cases, will result in stabilization of disturbed vacant lots sooner than the 60-day compliance period allowed in Rule 310.01, provide for the implementation of BACM. All measures were implemented prior to the June 10, 2000 BACM implementation deadline for the Phoenix area.

2. Most Stringent Measures

For its MSM comparison, the MAG plan identifies measures in Clark County (Las Vegas, Nevada) Rule 41 and South Coast Rule 403. MSM Study, pp. C-11 and C-16, 17.

Clark County Rule 41 limits off-road vehicle racing in the PM-10 nonattainment area to permanent race courses and prohibits off-road vehicle racing unless adequate dust controls approved by the District are implemented. The MAG plan concludes that because the Clark County rule fails to specify control methods, the two regulations cannot be adequately compared with respect to stringency.

In Maricopa County, we understand that permanent off-road race courses are required to obtain a general air quality permit and are therefore subject to Rule 310 requirements. While temporary off-road race courses are not necessarily subject to Rule 310, MCESD may plausibly require that dust suppressants be applied according to Rule 310.01 requirements for "vehicle use in open areas and vacant lots". Section 301. Thus, we agree with the MAG plan's assessment that the Clark County requirements are not more stringent.

South Coast Rule 403 prohibits visible fugitive dust emissions beyond the property line. The MAG plan deems the Rule 403 requirements equivalent in stringency to Maricopa County requirements with respect to control of fugitive dust from vacant lots. We believe that, since Maricopa County Rule 310 and Rule 310.01 both establish a specific list of controls for vacant lots, as well as appropriate standards and test methods to be used to determine source compliance, the rules are sufficiently stringent for these sources. The Maricopa County vacant lot standards may, in fact, be more stringent than South Coast Rule 403 requirements because

⁶⁸ Rule 310 requires any earthmoving operation that disturbs 0.1 acre or more to have a dust control plan, including weed abatement by discing or blading, whereas the Phoenix FIP rule weed abatement requirements only apply to disturbances equal to or greater than 0.5 acres. Rule 310, section 303.

they directly pertain to ensuring surface stability instead of simply requiring no visible emissions at the property line.

The MAG plan also identifies weed abatement operations in South Coast Rule 403(h)(I)(H) as potentially more stringent. See p. 3-15 in the MSM analysis. Rule 403 prohibits emissions of fugitive dust from any disturbed surface that remains visible beyond the property boundary of the emission sources. It exempts weed abatement operations from this requirement if the operation has been ordered by the agricultural commissioner or fire department provided that 1) mowing, cutting, or other similar process is used which maintains weed stubble at least three inches above the soil, or discing or similar operation is used if a determination is made by the agency issuing the weed abatement order that mowing or cutting of weeds is not practical. MCESD Rule 310, section 303 requires any earthmoving operation that disturbs 0.1 acre or more to have a dust control plan, including any weed abatement done by discing or blading and thus does not in any circumstances exempt weed abatement operations using discing or blading from dust control requirements like the South Coast rule allows. Section 303. Rule 310 also requires work practice standards for weed abatement. Section 308.8. In both regards, MCESD's rule is more stringent than South Coast's.

We, therefore, propose to find that the MAG plan correctly concluded that there are no most stringent measures in other State plans or used in practice elsewhere that are applicable to the Phoenix area.

Control measures for disturbed vacant lots are described in Table DVL-1. We propose to find that the MAG plan includes MSM for disturbed vacant lands.

TABLE DVL-1 ANALYSIS OF BACM AND MSM FOR DISTURBED VACANT LANDS			
SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
BACM			
Require dust mitigation plan submission and implementation by property owner for vacant parcels greater than 10 acres.	Partial	Yes	MCESD Rules 310 and 310.01 already require BACM level controls on all inactive disturbed areas on permitted facilities (Rule 310, section 302.3) and open area and vacant lots with 0.5 acres or more of disturbed surface (Rule 310.1, section 302). Permitting is a compliance mechanism and not an emission reduction measure. Maricopa County has committed to an aggressive enforcement program and we do not believe that permitting of vacant parcels greater than 10 acres is warranted.

TABLE DVL-1 ANALYSIS OF BACM AND MSM FOR DISTURBED VACANT LANDS		
SUGGESTED MEASURE	ADOPTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
Require vegetative and chemical stabilization and construction of windbreaks on public property adjacent to open land or lots	Yes	Disturbed vacant land in Maricopa County, regardless of ownership, is subject to the provisions of Rule 310 and Rule 310.01 for stabilization. In addition, section 37 of S.B. 1427 (1998) appropriated \$200K to implement a dust abatement and management plan for state lands in the Maricopa nonattainment area. The money does not lapse at the end of the fiscal year. MAG plan, p. 7-156.
Limit off-road use of recreational vehicles on open land	Yes	MCESD Rule 310.01, section 301 requires either stabilization of land disturbed by vehicle use or prevention of motor vehicle trespassing, parking and other access. The rule applies to vacant lots and open areas ≥ 0.1 acres.
MOST STRINGENT MEASURES (NOT ALREADY COVERED IN BACM SECTION)		
Controls on weed abatement	Yes	MCESD Rule 310 requires any earthmoving operation that disturbs 0.1 acre or more to have a dust control plan, including weed abatement by discing or blading. Section 303. Rule 310 also requires work practice standards for weed abatement. Section 308.8.
OTHER ADOPTED MEASURES		
Dust abatement and management plan for state lands	Yes	S.B. 1427 (1998) appropriates \$200K to implement a dust abatement and management plan for state lands in the Maricopa nonattainment area. MAG plan, p. 7-156.

Source of measures: Table 5-2, measures 41, 138, and 141; Table 10.7, measure 25.5

* For information on resources for implementing Rules 310 and Rule 310.01, see TSD section "MCESD's Commitments to Improve Compliance and Enforcement of the Fugitive Dust Program." For information on legal authority for Rules 310 and Rule 310.01, see TSD section, "General SIP Requirements: Adequate Personnel, Funding, and Authority." For information on the enforcement program for Rule 310 and Rule 310.01, see TSD section, "Description of the Enforcement Methods and State Back-Up Authority."

This section prepared by Karen Irwin.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR UNPAVED ROADS

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criterion 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including the measure's technological feasibility, costs, and energy and environmental impacts as needed, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State "demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area." CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area as necessary, compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source category, and provide for the adoption of any MSM that is more stringent than existing measures and provide for implementation as expeditiously as practicable or, in lieu of providing for

adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies unpaved roads as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-1.

Description of Unpaved Roads Source Category

This category includes re-entrained dust from vehicle travel on unpaved roads. There are three classes of unpaved roads in the Maricopa nonattainment area: public roads, private roads that are publicly maintained (also referred to as minimally-maintained or courtesy grade), and private roads that are privately maintained.⁶⁹

Emissions from Unpaved Roads in the Phoenix Area

Unpaved roads are the second largest source of PM-10 emissions in the inventory, accounting for 31.1 mtpd in 1994 or 21.6 percent of the total directly-emitted, non-windblown PM-10 inventory (1994 Regional Inventory, Table 2-3) and 13.1 percent of the 2006 pre-control total (including windblown) PM-10 inventory (MAG plan TSD, Table II-3). Total uncontrolled paved road dust emissions increase by 12 percent from 1995 to 2006 due to the increased vehicle miles traveled (VMT) between 1995 and 2006. (MAG plan TSD, Tables II-1 and II-3).

Existing Controls

From 1995 to 1999, Maricopa County and its local jurisdictions have paved more than 107 miles of unpaved road. MAG plan, p. 9-63.

The MAG plan includes Rule 310.01 requirements for unpaved roads, and also County, city and town commitments addressing unpaved roads.

In 1998, we promulgated a federal fugitive dust rule as part of our federal implementation plan (FIP) for Phoenix. 63 FR 41326. This rule establishes RACM for unpaved roads, among other sources. See 40 CFR 52.128(d)(3). We subsequently made revisions to the Phoenix FIP rule and the final version was published on December 21, 1999. See 64 FR 71304. The federal fugitive dust rule requires paving, applying chemical/organic stabilizers, or graveling any public

⁶⁹ Unpaved haul/access roads associated with permitted sites that are subject to Rule 310 are addressed in the section of this TSD titled "Implementation of BACM and inclusion of MSM for Construction Sites and Operations."

or publicly maintained unpaved road in the nonattainment area with average daily vehicle traffic that meets or exceeds 250. See 40 CFR §52.128(d)(2).

Does the plan meet the statutory and policy requirements?

Suggested Measures List for BACM and MSM Analysis

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for unpaved roads including potential most stringent measures from other States as well as provides information on their technological feasibility, costs, and energy and environmental impacts where appropriate.

The MAG plan includes three suggested measures for controlling fugitive dust from unpaved roads. Evaluation of unpaved road measures in other areas found none that are more stringent than the measures for unpaved roads in the MAG plan. MAG plan, Table 10-7. See Table UPR-1.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

In summary, MCESD Rule 310.01 requires stabilization of all unpaved public roads and alleys with 250 vehicle trips per day (VPD) or more by 2000 and 150 vehicle trips per day or more by 2004. Rule 310.01 and Rule 310 require stabilization of all unpaved utility roads with 150 VPD.⁷⁰ The County has committed to pave at least 60 miles of high VPD privately-owned roads and the City of Phoenix has recently paved all 80 miles of its publicly-owned roads. See Table UPR-1.

In Note 1, we provide a RACM/BACM evaluation of Rule 310.01 and County and city/town commitments to pave roads. In Note 2, we provide an MSM evaluation. We propose to find that the combined effect of MCESD's Rule 310.01 requirements, in addition to the County and city commitments to pave roads not subject to Rule 310.01, provides for the implementation of RACM/BACM and inclusion of MSM for unpaved roads.

⁷⁰ Our proposed approval of the County's strategy to target unpaved roads with 150 ADT or more should not be interpreted as a policy statement that controls on unpaved roads with less than 150 ADT are not important. Rather, we believe that this strategy is BACM for the Maricopa PM-10 nonattainment area at this time, given the large volume of unpaved roads and cost considerations involved in paving or otherwise stabilizing them.

TABLE UPR-1 ANALYSIS OF BACM AND MSM FOR UNPAVED ROADS		
SUGGESTED MEASURE	ADOPTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
BACM		
Surface treatment to reduce dust from unpaved roads and alleys	Yes	See discussion below under Note 1. Programs are generally implemented using existing personnel and City/Town/County general funds and/or state and federal transportation funds and program. Legal authority for Cities/Towns/County to maintain/improve roads found in A.R.S. 9-240 and 11-251, respectively. City/Town/County commitments for capital improvements are not regulatory programs and do not need a traditional enforcement program.
Traffic reduction/speed control plans for unpaved roads	Some	Yes Some jurisdictions committed to evaluate this measure. Two jurisdictions committed to posting 15 mph speed limit signs on private and public unpaved roads and access ways; one jurisdiction has posted 15 mph speed limits in all alleys. (See Table 10-9). Also, under Rule 310, owners/operators of unpaved haul roads and utility roads who comply with the rule by limiting vehicle trips to 20 per day, must also limit vehicle speeds to 15 mph. While speed limit controls are only being implemented to a limited extent, we believe the SIP measures to pave or otherwise stabilize unpaved roads in the Phoenix PM-10 nonattainment area establish the critical commitments for the implementation of BACM and the inclusion of MSM. Programs are generally implemented using existing personnel and City/Town/County general funds and/or state and federal transportation funds and program. Legal authority for Cities/Towns/County to maintain/improve roads in found in A.R.S. 9-240 and 11-251, respectively. City/Town/County commitments for capital improvements are not regulatory programs and do not need a traditional enforcement program.
Prohibition of unpaved haul roads	No	Yes Rule 310 requires that unpaved haul roads meet both a 20% opacity standard and a silt content or silt loading standard. Rule 310, section 302.2.
MOST STRINGENT MEASURES		
None	N/A	The MAG plan identified no unpaved road measures from other areas that are more stringent than the existing Maricopa measures. See discussion below under Note 2.

Source of measures: Table 5-2, measures 134 - 136

* For information on resources for implementing Rules 310 and Rule 310.01, see TSD section "MCESD's Commitments to Improve Compliance and Enforcement of the Fugitive Dust Program." For information on legal authority for Rules 310 and Rule 310.01, see TSD section, "General SIP Requirements: Adequate Personnel,

Funding, and Authority.” For information on the enforcement program for Rule 310 and Rule 310.01, see TSD section, “Description of the Enforcement Methods and State Back-Up Authority.”

Note 1. BACM for Unpaved Roads and Alleys

In determining whether the MAG plan provides for the implementation of BACM for unpaved roads, we are also considering whether the plan provides for the implementation of RACM for these sources. See Footnote 60. In our FIP, we promulgated a RACM fugitive dust rule applicable to unpaved roads in the Phoenix PM-10 nonattainment area. See 40 CFR 52.128(d)(3). This rule provides a starting point for determining whether the MAG plan measures for unpaved roads meet RACM. It is not necessary for the MAG plan measures to be identical to the FIP rule in order to meet the CAA’s RACM requirement, but only that they provide for implementation of RACM. However, if the submitted measures for a particular source are identical to the FIP rule, we can determine without further analysis that the MAG plan has provided for RACM for that source.

The FIP rule’s requirements for unpaved roads are as follows:

- Unpaved roads that are owned/operated by any federal, state, county, municipal or other governmental or quasi-governmental agency, that have average daily trip (ADT) volumes of 250 vehicles or more are required to be paved, treated with chemical/organic stabilizer, or graveled according to the applicable rule standards/test methods. Applicable standards include a 20% opacity standard, and a 6% silt content standard and/or a 0.33 oz/square foot silt loading standard. Compliance is required by June 10, 2000.

By the FIP rule’s definition, “owner/operator” means any person who owns, leases, operates, controls, maintains or supervises a fugitive dust source subject to the rule’s requirements. Therefore, the FIP rule requirements apply not only to publicly owned unpaved roads, but also to privately owned unpaved roads that are publicly maintained. This is an important distinction because many unpaved roads in Maricopa County are classified as privately owned, publicly maintained. (See “Private Unpaved Roads” below for further discussion.)

In comparing Rule 310.01 requirements to the unpaved road FIP rule requirements, they both require unpaved roads located in the PM-10 nonattainment area with 250 vehicles per day (VPD) or more to be stabilized by June 10, 2000. Also, Rule 310.01’s control options and standards/test methods for unpaved roads are the same as the FIP rule’s. Additional strengthenings to Rule 310.01 beyond the FIP rule requirements include:

- A requirement that publicly owned unpaved roads with 150 VPD or more must be stabilized by June 10, 2004.⁷¹

⁷¹ The lower compliance threshold of 150 VPD has been submitted as BACM.

- Control requirements for private unpaved utility easement, rights-of-way and access roads with ≥ 150 VPD.⁷² Compared to the Rule 310.01 requirements for publicly owned unpaved roads, the compliance period is immediate (effective the date the rule was adopted, i.e. February 16, 2000) as opposed to June 10, 2000. Again, the applicable control methods and standards/test methods are the same for these unpaved roads as those covered under in the FIP rule.

Other differences between the FIP rule and Rule 310.01 include:

- Rule 310.01's terminology for unpaved road traffic levels is vehicles per day (VPD), as compared to the FIP rule's use of average daily trips (ADT).⁷³ In their efforts to assess unpaved road usage in order to comply with applicable rule requirements, Maricopa County public entities are relying on tube counts to assess VPD, which are the most accurate method for determining vehicle usage and are included in the FIP rule as a means of calculating ADT. Furthermore, EPA and/or MCDOT can rely upon credible evidence to establish the approximate vehicle usage if there is concern that VPD is not being properly assessed by a regulated public entity.
- The Phoenix FIP rule applies to all privately owned roads that are publicly maintained with ≥ 250 ADT, whereas Rule 310.01 applies strictly to publicly owned roads. (For discussion of Maricopa County private road commitments, see "Private Unpaved Roads" below.)

1. Public unpaved roads and alleys

The principal control for public unpaved roads and alleys is Rule 310.01, section 304, which requires all publicly-owned unpaved roads and alleys with 250 vehicles per day or more to

⁷² This requirement in section 307 of Rule 310.01 covers unpaved utility roads that are not otherwise subject to Rule 310.

⁷³ The FIP rule defines ADT as the average number of vehicles that cross a given surface during a specified 24-hour time period as determined by the Institute of Transportation Engineers Trip Generation Report (6th edition, 1997) or tube counts. According to MCDOT, calculating ADT is a more formalized process appropriate for paved roads, where a year's worth of data is collected for a given road classification in order to establish correction factors, prior to the use of tube counts over a 48-hour period. Such data is not available for unpaved roads so the County and cities are relying on 48-hour tube counts to establish daily vehicle traffic levels. We accept this as credible evidence of traffic use levels for the purposes of controlling fugitive dust from unpaved roads. Thus, the reference to ADT found in MCDOT's commitment to pave 60 miles of minimal maintenance unpaved roads with ≥ 150 ADT actually refers to 150 vehicle trips per day (VPD) as established by a 48-hour tube count.

be stabilized by June 10, 2000 and those with 150 vehicles per day or more to be stabilized by June 10, 2004.

Several cities have commitments that go beyond the requirements of Rule 310.01 for publicly-owned unpaved roads. For example, the City of Phoenix committed to, and recently accomplished, paving all 80 miles of its publicly-owned unpaved roads regardless of the level of vehicle traffic. Phoenix Commitment, Measure 98-DC-7. Other cities, such as Tempe and Gilbert, have very few remaining miles of public unpaved roads/alleys. See Tempe Commitments, Measure 98-DC-7 and Gilbert Commitments, Measure 98-DC-7.

2. Private Unpaved Roads

Rule 310, section 308.6, requires that easements, rights-of-way, and access roads for utilities (electricity, natural gas, oil, water, and gas transmission) that receive 150 or more VPD must be paved, chemically stabilized, or graveled in compliance with the rule's standards.

Private unpaved roads are scattered throughout Maricopa County, within both County and city jurisdictions. A number of these private roads are minimally maintained by the local jurisdiction. Under contract to us, Pacific Environmental Services (PES) conducted a survey of unpaved roads, unpaved parking lots and vacant lots in Maricopa County. See PES, "Survey for Fugitive Dust Emission Sources," April 15, 1999. The survey included available information on both public and private unpaved roads and determined that the great majority of identified unpaved road mileage consists of privately-owned roads that receive minimal maintenance by the Maricopa County Department of Transportation (MCDOT).⁷⁴

MAG and MCDOT have committed to pave County minimal maintenance roads within the nonattainment area that currently exceed 150 ADT⁷⁵ and meet criteria to become public highways, using \$22 million from CMAQ and MCDOT funds. MAG Commitments; Maricopa County Commitment, 1999 Revised Measure 17. This program will pave an estimated 60 miles of unpaved roadways in fiscal years 2001-2003 which is approximately 20 percent of the privately-owned, publicly-maintained County-jurisdiction roads and accounts for 40 percent of vehicle miles traveled on these roads. Maricopa County has also committed to continue to evaluate other roads for funding when traffic levels increase above 150 vehicle trips per day. Maricopa County Commitment, 1999 Revised Measure 17. We interpret this commitment to apply to any private roads within County jurisdiction, whether they currently receive minimal maintenance or not.

⁷⁴ The inventory did not include County-jurisdiction private roads that are not maintained by MCDOT.

⁷⁵ The MAG plan commitment uses ADT in error as opposed to VPD. See footnote 73 for further information.

As the County evaluates roads for paving, it may make exceptions to its commitment to pave roads with vehicle trips that exceed 150 VPD and meet criteria to become public highways. The County's evaluation process takes into account whether estimated costs of paving are excessive (greater than \$500,000 per mile).⁷⁶ An example provided in the MAG plan's BACM analysis as to why costs may be excessive is when structural deficiencies exist on an unpaved road (e.g. drainage issues, road needs to be realigned, or utilities or private structures intrude into the right-of-way). Maricopa County commitments, fourth submittal titled "BACM/RACM justification for Unpaved Roads." When MCDOT identifies a road that meets its criteria (i.e. the road can be declared a public highway and costs are not excessive), it will recommend that the Board of Supervisors open and declare the road a public highway.

Because BACM determination properly takes costs into account, we believe that MCDOT's criteria for selecting private roads to pave are suitable in the context of a BACM strategy and will result in control of the great majority of high traffic unpaved roads.

In its commitment to pave unpaved roads, Maricopa County mentions that acquiring right-of-way, which is necessary for the County to have the legal authority to pave, and securing funding, can be a slow process that takes three to five years due to legal complexities. Given the realities of obtaining rights of way and funding, we believe that the timeframe for paving unpaved roads in the County's commitment is consistent with the implementation of RACM/BACM by MCDOT.

Maricopa County also includes other information in its commitment regarding: 1) the inability of private property owners to restrict use of their roads; 2) "regulatory takings" issues if road owners pay for improvements that benefit others; 3) a reference to Arizona law that prohibits the spending of public monies for road improvements that benefit owners; and 4) liability implications of road paving. However, we do not consider these arguments relevant to the commitment made by Maricopa County to address private unpaved roads nor the County's ability to carry out its commitment.

Maricopa County provided an update to us of their efforts to identify and pave County minimal maintenance roads. Email, Kelly McMullen, MCDOT, to Karen Irwin, EPA, May 4, 2001. The County identified approximately 68 miles of minimal maintenance roads (courtesy grading only) that potentially could have over 150 VPD traffic. Of those roads, the County was unable to gather traffic count information for approximately 3 miles due to repeated counter vandalism or theft. The County included remaining roads with traffic counts over 130 VPD (allowing for short term growth, seasonal variation, etc.) in its program to pave, totaling approximately 65 miles, consisting of approximately 186 segments.

⁷⁶ A private road begins to bear other than local traffic through extensions of other nearby public roads or the construction of an indirect source that attracts external drivers using the road as a short cut. See Maricopa County Commitments, 1999 Revised Measure 17.

Each of these road segments were inspected by Maricopa County staff for preliminary evaluation of what environmental impacts might occur from paving, right-of-way needed, drainage issues, and roadway alignment/traffic engineering issues. Based on those inspections, the County divided the roadways into three groups based on geography and the amount of design, permitting and other work needed prior to paving. The first group is expected to have a bid awarded in June 2001, and be paved by Fall 2001. Design work for the second group will begin in June 2001, and is expected to go to bid for construction within the next twelve months. Design work for the third group will begin in Summer 2001, and is expected to be bid approximately 10-12 months following the second group, as the third group reflects the most difficult engineering and environmental issues. Based on project engineer estimates at this time, the County believes that six segments totaling approximately 3.0 miles may exceed the reasonable cost threshold of \$500,000 per mile, or have issues with adjoining property owners that are not possible to resolve within the SIP time frames. The County will evaluate whether another method of dust suppression may be viable for those segments.

PES also surveyed several cities/towns regarding private unpaved roads in their jurisdictions. PES was unable to survey six jurisdictions (Avondale, Carefree, Cave Creek, El Mirage, Goodyear, and Surprise), however, these are all relatively small cities/towns and, because their populations are low and they are on the urban fringe, they are unlikely to have unpaved roads that exceed 150 VPD. Eight jurisdictions (Fountain Hills, Guadalupe, Paradise Valley, Buckeye, Queen Creek, Tempe, Tolleson, and Youngtown) declared having zero or minimal miles of private unpaved roads. Chandler indicated it has 5 miles of private unpaved roads which are publicly accessible, but believes all of these roads receive less than 250 average daily trips. Scottsdale indicated it has 65 miles of privately-owned, city-maintained unpaved roads, 20 miles of which had already been paved at the time the survey was conducted and 13 miles were planned for paving.⁷⁷ Other cities (Gilbert, Glendale, Mesa and Phoenix) surveyed indicated that a few miles of unpaved private roads were already treated or were scheduled to be treated but were not able to provide further details on the mileage of or ADT on private unpaved roads in their jurisdictions.

We mailed a letter to MAG requesting additional information on private unpaved roads from the cities of Chandler, Scottsdale, Gilbert, Glendale, Mesa, Phoenix, Tempe, Peoria, Avondale, Carefree, Cave Creek, El Mirage, Goodyear, and Surprise. Letter Colleen McKaughan, EPA, to Lindy Bauer, MAG, March 21, 2001. All but three cities (Scottsdale, Gilbert, and El Mirage) responded to MAG's survey. Letter, Lindy Bauer, MAG to Colleen McKaughan, EPA, June 29, 2001.

Five of the cities (Avondale, Carefree, Chandler, Goodyear, and Tempe) affirmed they currently have no private unpaved roads with > 150 VPD. Three cities (Glendale, Mesa, and

⁷⁷ Thus, approximately 50 percent of the 65 miles of private roads identified by the City of Scottsdale have been or are scheduled to be paved.

Surprise) indicate they do not believe there are private unpaved roads with > 150 VPD in their jurisdictions.⁷⁸ The remaining cities either have a small number of private road miles identified with > 150 VPD or make no statement regarding the number of private road miles with > 150 VPD in their jurisdictions.

With respect to potential increases in traffic on private unpaved roads in city jurisdictions, there are a couple of means (short of condemnation by the city) that would result in the paving or surface treatment of a private road: 1) most municipalities, if not all, have laws requiring that developers of subdivisions pay for the paving of access roads to and from the new development. Where the development of a subdivision occurs along an existing private unpaved road and increased traffic levels are anticipated, developers are held responsible for paving the road., 2) private owners living along the road may choose to form an Improvement District to pay for road paving or surface treatment. Cities do not have authority to require private roads to be stabilized through Improvement Districts. Some cities appear to be proactive in encouraging Improvement Districts, e.g. Peoria, Mesa and Surprise. (We also note that in a 1998 SIP commitment from El Mirage, adequate information is provided to indicate that the City has approximately six unpaved private road miles and that it will propose an improvement district program for paving those miles.)

As described earlier in this section, information received from Scottsdale in their SIP commitment indicates they have controlled or are in the process of controlling half of the private unpaved road miles in their jurisdiction. This suggests that unpaved private road miles in Scottsdale are being addressed to the best of the City's ability. Only two (Phoenix and Gilbert) of the twenty cities in the nonattainment area have not provided information to allow us to make any determination of whether private unpaved road miles with > 150 ADT exist in their jurisdictions, nor have they provided information on city efforts to address any such private unpaved roads.⁷⁹ We also recognize that existing laws limit municipal authority to address private roads, and while cities may be able to encourage improvement districts, they cannot require private road owners to donate right-of-way.

Although available information on private roads in some city jurisdictions is limited, our existing information suggests that the vast majority of privately owned unpaved roads have low

⁷⁸ Information from Glendale is supplemented by a phone conversation with Douglas Kukino on August 1, 2001 and information from Surprise is supplemented by a phone conversation with Brian Pirooz on August 6, 2001.

⁷⁹ In its SIP commitment (Phoenix commitments, Measure 98-DC-8), Phoenix indicates that it will pave approximately 3.2 miles of private unpaved streets through an Improvement District program.

ADT.⁸⁰ Since private roads are largely not inventoried, it is possible that a few miles of private roads with ADT exceeding 150 will not be controlled unless road owners expressly form an improvement district and fund paving or surface treatment. We believe that future increases in traffic on private unpaved roads would primarily occur with development of large subdivisions, in which circumstance the roads will be paved under local laws. There is no evidence available to us to suggest that private unpaved roads in city jurisdiction would hinder Maricopa County's ability to achieve the 24-hour PM-10 standard. Notwithstanding, we encourage cities in the nonattainment area to take steps to inform private unpaved road owners of the health issues associated with PM-10 and encourage the formation of improvement districts for any private roads with significant traffic levels.

New Unpaved Roads. Because of growth in the Phoenix area, it is very likely that new unpaved roads may be created. Several existing requirements are in place to deal with this. The MAG plan indicates that the Maricopa County roadway design standard requires that all new subdivision roads and County-built roads be paved. Maricopa County commitment, 1999 Revised Measure 17.

Also, ten jurisdictions require roads serving new multi-family, commercial, and industrial development to be paved. Nine jurisdictions require roads serving new residential developments to be paved. MAG plan, Table 10-9. While, in the remaining jurisdictions it is possible that new unpaved roads will be built, the requirements of Rule 310.01 apply to any such public roads that receive traffic levels exceeding 150 ADT.

For reasons discussed above, we propose that the combined effect of Rule 310.01 requirements and County and city commitments in the MAG plan to pave roads provides for the implementation of RACM for unpaved roads currently subject to the FIP rule. We believe the overall reduction in high ADT unpaved road miles that will be achieved under the MAG plan is much larger than that which would be achieved through implementing the FIP rule, given the lower 150 ADT threshold among other factors. For this reason, we also propose that the combined effect of the Rule 310.01 requirements and County/city paving commitments provide for the implementation of BACM.

The MAG plan shows that jurisdictions are implementing unpaved road measures to varying degrees, which can be attributed to differences in the type and extent of local sources and budgets. CAA requirements to implement BACM and include MSM are a collective obligation

⁸⁰ Among the 100 plus segments of unpaved privately-owned and maintained roads that were identified in the PES survey, the contractor estimated using aerial photographs that only 6 of these have ADTs that exceed 150. Tube counts, which are more accurate than other methods to estimate ADT, were not conducted on these roads. Written responses from cities as well as conversations with various city personnel further establish the preponderance of evidence that the great majority of private road miles in city jurisdictions have low traffic.

of the nonattainment area and not of individual jurisdictions within that nonattainment area. Therefore, to judge whether the MAG plan provides for implementation of BACM and for the inclusion of MSM, we have focused on the combined effect of local commitments on the region as whole rather than judging compliance jurisdiction by jurisdiction.

Moreover, because BACM and MSM are obligations of the nonattainment area, we do not judge one jurisdiction's efforts against another nor consider one jurisdiction's efforts to set a BACM or MSM standard that other jurisdictions must meet or provide a justification for not doing so. Just because one jurisdiction has adopted a measure does not compel the others under the BACM or MSM requirements to do the same.

Note 2 - Most Stringent Measures for Unpaved Roads

The MAG plan did not identify any other State's measures that are more stringent than the ones already in the plan. Upon an independent review of existing unpaved road measures as discussed below, we concur.

The commitments and rules in the MAG plan for controlling unpaved roads can be compared to South Coast Rule 1186 requirements and Clark County's "PM-10 Offset Paving Program."

South Coast Rule 1186 requires owners/operators of unpaved public roads to address roads with greater than the average ADT by paving at least one mile, chemically stabilizing 2 miles, or placing speed limits or speed bumps on 3 miles of road each year over a 9-year span. We believe Maricopa County's commitments may exceed the emission benefits provided by South Coast Rule 1186 because they are not limited to public unpaved roads, provide for paving much more extensive road mileage in the near-term, and do not contain an option for jurisdictions to fully rely upon speed controls which may be difficult to enforce.

Clark County's "PM-10 Offset Paving Program" relies upon collection of fees from permitted PM-10 sources to pave unpaved roads, as prioritized by ADT. The program's goal is to pave all unpaved roads inventoried in 1995 that have greater than 30 ADT. The Las Vegas Serious area plan projects that this program will result in a 38 percent decrease in unpaved road lineal miles by 2001, with a corresponding 67 percent decrease in emissions.

While, at face value, this program appears to be significantly more stringent than the totality of the unpaved road measures in the MAG plan, we do not believe the Clark County program as currently set up will achieve this level of reductions in practice in that some of the fees collected to pave existing unpaved roads may be funding the paving of unpaved roads associated with new development. We believe MAG plan's program to control fugitive dust from unpaved roads is among the most stringent in practice today, in terms of the extent of high ADT unpaved road mileage being reduced in a single PM-10 nonattainment area.

This section prepared by Karen Irwin.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR CONSTRUCTION ACTIVITIES AND SITES

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including the measure's technological feasibility, costs, and energy and environmental impacts as needed, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State "demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area." CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area. Next, the plan must compare potential most stringent measures for the significant source category against the existing BACM or other measures, if any, for that source category. For more any measures found more stringent, the plan must provide for the

adoption of any MSM that is more stringent than existing measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies construction activities as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-1.

Description of Construction Source Category

Sources of fugitive dust emissions at construction site sources include land clearing, earthmoving, excavating, construction, demolition, material handling, bulk material storage and/or transporting operations, material trackout or spillage onto paved roads (which we have addressed under the paved road category), and vehicle use and movement on site (e.g., the operation of any equipment on unpaved surfaces, unpaved roads and unpaved parking areas). Windblown emission from disturbed areas and inactive storage piles on construction sites are also a source of PM-10. Construction operations which are essentially various earthmoving operations represent the majority of emissions in this source category.

Emissions from Construction Activities in the Phoenix Area

Collectively, emissions from construction activities including operations and windblown emissions are the second largest contributor to PM-10 emissions in the Phoenix area. Both the base year and future year inventories treat each category of construction related emissions—operations and windblown—as separate emission categories. Table CST-1 shows the emissions from construction.

TABLE CST-1 EMISSIONS FROM CONSTRUCTION-RELATED SOURCES (AVERAGE ANNUAL DAY)			
		OPERATIONS	WINDBLOWN
1995 modeling year	mtpd	44.5	4.5
	percent of inventory	23.3	2.4
2006 projected year – uncontrolled	mtpd	49.5	5
	percent of inventory	24.5	2.5
Growth between 1995 and 2006		11%	9%

Does the plan meet the statutory and policy requirements?

Existing Controls

MCESD Rule 310 establishes requirements for all categories of emissions from construction sites.

Suggested Measure List for BACM and MSM Analysis

The MAG plan includes three suggested measures for controlling emissions from construction sites. The suggested measures are for the most part means of improving compliance with controls as opposed to new controls for these sources and are based on the understanding that the exist fugitive dust rule, Rule 310, combined with MCESD's commitments, already includes a comprehensive set of controls for construction sources. See Table CST-2.

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for construction sites based on our review of Rule 310 and additional SIP commitments.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

See Table CST-2. Under CAA sections 110(k)(3), 189(b)(1)(B) and 188(e), we propose to find that the MAG plan provides for the implementation of BACM and inclusion of MSM for construction activities and windblown dust from disturbed land on construction sites for both the annual and 24-hour PM-10 standard. This proposal supercedes the proposal to find that the MAG plan provides for the implementation of BACM for construction sites in the annual

standard proposal. See 65 FR 19964, 19980. See also Note 1 below and Footnote 86. As noted before, we have evaluated the track-out requirements for construction sites in the section evaluating controls for paved road dust. We discuss MCESD's commitments to improve compliance and enforcement of Rule 310 in the attainment demonstration section.

TABLE CST-2 ANALYSIS OF IMPLEMENTATION OF BACM AND MSM FOR CONSTRUCTION SITES		
SUGGESTED MEASURE	IMPLE- MENTED? If No, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE*
BACM		
Strengthen and better enforcement of fugitive dust control rules	Yes	Control requirements in MCESD Rule 310 are strengthened to meet the requirements to implement BACM and include MSM. See Note 1 below and discussion in Section 6 of the annual standard TSD evaluating Rule 310. Maricopa County committed to extensive improvements to its compliance and enforcement program for implementing fugitive dust controls on construction sites. Maricopa County commitment, revised measures 6. We discuss these improvements more extensively in Note 1 below . Note: we do not consider improved enforcement a BACM but rather a method of implementing BACM. BACM is an emissions limitation or control requirement applied to a specific source.
Mitigation bond requirements for construction and development projects to provide funding for agencies to control project emissions in event of contractor noncompliance	No	Yes The MAG Air Quality Committee recommended including this measure as part of the strengthening and better enforcement of fugitive dust control rules. MAG plan, p. 6-4. As with improved enforcement, mitigation bonds are a means of ensuring the implementation (through enforcement) of BACM and not a BACM itself because they are used only to assure compliance with existing control requirements and not to impose new control requirements. It is an enforcement mechanism because noncomplying contractor suffers an economic penalty (i.e., the amount of money deposited to meet the bonding requirement, money that would come back to the contractor if the bond is never invoked) for failure to comply. We are proposing to find that Rule 310 is BACM and MCESD's commitments to improve compliance with and enforcement of Rule 310 provide for the implementation of BACM. This measure was also considered a potential MSM. As with BACM, MSM is an emission limitation or control requirement applied to a specific source and not a means of assuring compliance with an existing control measures.

TABLE CST-2 ANALYSIS OF IMPLEMENTATION OF BACM AND MSM FOR CONSTRUCTION SITES		
Dust control plans for construction/land clearing with elements addressing trackout prevention, site and material maintenance construction staging, and high wind operating restrictions	Yes	MCESD Rule 310 requires all earthmoving operations over 0.1 acres to obtain dust control permits which address these requirements. Sections 303, 304.3, and 301.1.
MOST STRINGENT MEASURES (NOT ALREADY COVERED IN BACM SECTION)		
See Note 2 below.		

* For information on resources for implementing Rules 310 and Rule 310.01, see TSD section "MCESD's Commitments to Improve Compliance and Enforcement of the Fugitive Dust Program." For information on legal authority for Rules 310 and Rule 310.01, see TSD section, "General SIP Requirements: Adequate Personnel, Funding, and Authority." For information on the enforcement program for Rule 310 and Rule 310.01, see TSD section, "Description of the Enforcement Methods and State Back-Up Authority."

Note 1. Rule 310

The applicable requirements for construction sites are found in Rule 310. The requirements apply to any source required to obtain a permit under Maricopa County rules, which includes earthmoving operations of 0.10 acre or more and sources subject to Title V permits, Non-Title V permits, or General Permits. In addition to requirements for fugitive dust sources located at any permitted source, Rule 310 requires that a Dust Control Plan (DCP) be submitted for any earthmoving operations of 0.10 acre or more, and that the DCP be approved prior to commencing any dust generating operation. The rule's definition of a dust generating operation includes any activity capable of generating fugitive dust including land clearing, earthmoving, weed abatement by disking or blading, excavating, construction, demolition, material handling, storage and/or transporting operations, vehicle use and movement, the operation of any outdoor equipment or unpaved parking lots. For other permitted sources, Rule 310 requires that a DCP be submitted and approved prior to commencing any routine dust generating activity, defined as any dust generating operation which occurs more than 4 times per year or lasts 30 cumulative days or more per year.⁸¹

Specific Rule 310 requirements include:

⁸¹ This is in addition to the requirement to submit a DCP for any earthmoving operations that disturbs 0.10 acre or more even if the operation is subject to Title V or other permitting requirements.

- a 20 percent opacity requirement for any dust generating operation
- wind event control requirements
- implementation of control requirements before, after and while conducting any dust generating operation, including weekends, after work hours and holidays
- required controls and standards for:
 - unpaved parking lots
 - unpaved haul/access roads
 - disturbed open areas and vacant lots
 - bulk material hauling
 - bulk material spillage, carry-out, erosion and trackout
 - open storage piles
 - weed abatement by blading or discing
- a requirement in dust control plans for at least one primary and one contingency control for all fugitive dust sources; the contingency measure is to be immediately implemented if the primary controls proves ineffective

In order to comply with the rule's 20 percent opacity standard and dust control plan requirements for implementing primary and/or contingency controls for earthmoving activities,⁸² sources need to apply one or more controls, which in most cases includes applying water or another dust suppressant before and during operations. Inactive disturbed surfaces must be stabilized to meet at least one of the rule's stabilization standards (e.g. visible crusting, 10 percent rock cover, etc.). Unpaved roads and unpaved parking lots must also be stabilized to meet both a 20 percent opacity standard and a silt content/loading standard.⁸³ Test methods associated with stabilization and opacity standards are contained in Appendix C, which was submitted with Rule 310.

Recent revisions to Rule 310 that have had significant impact on increasing the rule's stringency include the addition of specific work practice standards, the addition of stabilization standards and test methods for unpaved surfaces, and modifications to the opacity test method, which including adding an alternative opacity test method for unpaved roads and unpaved parking lots and modifying the opacity test method for other sources. We believe that the new

⁸² Earthmoving operations include cutting and filling, grading, leveling, excavating, trenching, loading or unloading of bulk materials, demolishing, blasting, drilling, adding to or removing bulk materials from open storage piles, back filling, soil mulching, landfill operations, or weed abatement by discing or blading.

⁸³ Unpaved roads must meet a 6 percent silt content standard or, alternatively, a 0.33 oz/ft² silt loading standard, while unpaved parking lots must meet an 8 percent silt content standard or, alternatively, a 0.33 oz/ft² silt loading standard.

and/or revised standards/test methods provide for a greater degree of control than under the previous (SIP-approved) version of Rule 310.

For example, the SIP-approved Rule 310 required that disturbed surface areas be stabilized through the application of reasonably available permanent controls. However, the rule did not specify what this meant; the only quantitative standard that applied was a 20 percent opacity standard. Compliance with the 20 percent opacity standard was gauged using a test method that requires observation according to 15 second intervals. Since dust from inactive disturbed surfaces is windblown and wind gusts do not typically occur at regular intervals, we believe this test method may not appropriately gauge whether a source is sufficiently controlled. In order to increase the rule's effectiveness for disturbed surfaces, MCESD revised the rule to include a list of surface stabilization standards and test methods. Permitted sources subject to the rule can apply various techniques to meet the standards. This enables not only better understanding among both regulators and the regulated community of how to comply with the rule, but also establishes a more protective threshold than the previous applicable standard/test method. This Rule 310 strengthening typifies similar strengthenings for a variety of fugitive dust sources subject to the rule.

For a more detailed discussion of Rule 310's requirements and our evaluation of its requirements, see the evaluation of Rule 310 in section 6 of the annual standard TSD.

In addition to these Rule 310 revisions, MCESD made three enforceable commitments to further strengthen requirements for construction sites in 1999. See Maricopa County Commitments, Revised Measure 6. MCESD has recently revised these commitments and will take the revisions to the Maricopa County Board of Supervisors in December 2001 for formal adoption as enforceable commitments. See Letter, Al Brown, MCESD to Jack Broadbent, EPA, September 13, 2001. The revisions do not change the substantive aspects of the original enforceable commitments, although one has been expanded into two parts. For detailed discussion on MCESD's proposed revisions to the commitments, see MCESD's September 13, 2001 letter.

The commitments are to:

- Research and develop a standard(s) and test method(s) for earth moving sources, designed to be enforceable and meet BACM requirements as to stringency and the number of sources that it applies to. Revise Rule 310/appendix C by no later than December 2002 to modify the existing opacity standard/test method or add an additional opacity standard(s)/test method(s), tailored to non-process fugitive dust sources that create intermittent plumes. This commitment will be met in its entirety only if the standard(s)/test method(s) is approved by EPA.

The County is also proposing to support and coordinate with Clark County in the ongoing research to develop fugitive dust test methods through the appropriation of \$25,000.

2. Part 1: Onsite Implementation of Dust Control Plan

Raise awareness of onsite project supervisors to acquire and read approved site dust control plans thereby improving the implementation of the dust control plan at the construction site. This will be achieved through one-on-one contact at the time of inspection and through the development of a revised training curriculum and supporting materials for both a classroom setting and onsite aids for improved project management. Maricopa County inspectors will continue to go over dust control plans with construction site personnel during the initial site inspection and whenever issues arise during subsequent inspections. The ADOT project training module is scheduled for completion in winter of 2002 and implementation of the second level of dust control education will begin March--June 2003.

Part 2: Dust Control Plan Improvements

Research, develop and incorporate additional requirements for dust suppression practices/equipment into dust control plans and/or Rule 310 by March--December 2002. Based on the Arizona Department of Transportation (ADOT) project research, MCESD research or other alternative research, Maricopa County will develop a growing list of criteria for effective versus ineffective dust suppression practices that address various site circumstances.

3. Revise the sample daily recordkeeping logs for new and renewed Rule 310 permits to be consistent with rule revisions and to provide sufficient detail documenting the implementation of dust control measures required by Rule 310 and the dust control plan. Distribute sample log sheets with issued permits and conduct outreach to sources by December 2001.

The first commitment addresses our concern that the existing opacity standard and test method for earthmoving operations may not always be sufficient to control construction site dust to BACM levels. MCESD has already revised the opacity test method to deal partially with this concern (see Rule 310, Appendix C),⁸⁴ but we believe that additional standards/test methods are needed to fully assure that sources are effectively controlled.⁸⁵

⁸⁴ The opacity test method in Appendix C to determine compliance with the rule's 20 percent opacity standard for earthmoving operations has been better tailored towards the intermittent and mobile nature of these sources.

⁸⁵ For example, it is unclear whether the test method can be effectively used when dust plumes are generated by heavy vehicles in "turn-around" areas that may be only infrequently watered (if at all) and during bulk material collection/dumping.

Field research is needed to identify an appropriate standard(s) and test method(s) to meet this commitment. MCESD indicated that it was not able to fund research in 1999. Research on test methods for earthmoving sources has recently been conducted by Clark County. Clark County is planning to conduct a second phase of research. MCESD indicates in its commitment that it will contribute funding to these efforts. MCESD has requested a one-year extension of the deadline in its original commitment in order to monitor, validate and verify the resulting test method(s) performance in Maricopa County.

The second commitment addresses our concern that the DCPs lack specific criteria for dust suppressant application. For example, a source engaged in grading or cut-and-fill earthmoving for a multi-acre project may choose to comply with Rule 310 by applying water. However, neither the rule nor DCPs establish minimum criteria for the number of water trucks/water application systems and water truck capacity for any given size construction site or a ratio of earthmoving equipment to water trucks. Also, for effective dust control, certain soil types may require substantial pre-wetting, thorough mixing of water into the soil for uniform penetration, and/or dust surfactant or tackifier combined with water; neither Rule 310 nor DCPs currently require such measures for any sites.

Establishing criteria for dust control is complicated by variations in soils, meteorological conditions, equipment size/use, project phase, and level of activity. All these factors can impact the amount of water (or other controls) needed to control fugitive dust on a particular site on a particular day, making it difficult to establish criteria that can be applied to all sites at all times. MCESD has revised its previous commitment to allow more time to develop criteria to address a multitude of circumstances.

The need for specific criteria lessens if a firm standard(s) is established to gauge source compliance (i.e., emphasis is placed on whether the standard is met, not on how it is met). Thus, if in meeting the first commitment, MCESD incorporates additional standards/tests into Rule 310 that increase the certainty of adequate control, this may lessen the necessity for detailed requirements on dust suppressant application and/or equipment. Even so, we anticipate that some new requirements will be necessary to ensure adequate control, particularly for sites where soils tend to have low water permeability and during the driest seasons. In meeting this commitment, MCESD should evaluate the following in addition to other possible requirements:

- pre-wetting a minimum number of days prior to earthmoving operations and/or using a surfactant, tackifier, or chemical/organic dust suppressant in combination with water for better permeability;
- adequate mixing of water into the soil across the entire disturbed area, including vehicle turn-around areas;
- a ratio of water truck equipment to earthmoving equipment and/or project size.

MCESD indicates that it will review the DCP form again based on the results of an ADOT project, which is expected to generate information on dust palliatives and mitigation measures, an environmental management system (EMS) project for construction, and any applicable projects from other PM-10 nonattainment areas. MCESD's commitment letter. The request to extend the deadline for meeting this commitment to December 2002 will enable this work to be completed.

MCESD has also expanded its original commitment to include a program to work with on-site supervisors to assure that they obtain and review the DCP for their sites. In implementing Rule 310 during the last year, it found that site supervisors do not have or do not know what is in their DCPs and thus may not be implementing appropriate dust control methods.

The third commitment addresses our concern that while Rule 310 currently contains an acceptable recordkeeping requirement, a more specific recordkeeping requirement would help improve compliance. Currently neither the rule nor DCPs specify what information should be included in a daily log. MCESD has committed to revising and distributing to permitted sources daily recordkeeping log sheets to provide sufficient detail documenting the implementation of dust control measures. MCESD's commitment letter. We believe that the log sheet should require the following type of information, in addition to other information on control measures implemented, to be completed by site owners/operators each work day:

- initial start and final stop time of wet suppression equipment for each work day;
- the frequency (e.g. record the date and time) when water tanks are refilled;
- if bulk material other than soil is stored or handled, a description of the type and cumulative volume of material;
- daily verification that the water truck(s) is/are operational or a statement to indicate the nature of the breakdown and steps taken to repair it/them;
- whether wind gusts or average wind speeds exceed 25 miles per hour and the source of this meteorological data.

MCESD indicates that the County drafted a recordkeeping form for public comment and held a stakeholder meeting in February 2001. MCESD's September 13, 2001 letter. The stakeholders expressed concerns with the form and elected to try to develop their own draft form, which explains the delay in meeting the original deadline for this commitment. MCESD proposes an extension through December 2001, which would allow time for the Department to hold additional outreach and educational meetings through the Fall on the draft revised sample recordkeeping formats. MCESD indicates it will continue to try to develop a sample recordkeeping form that contains an appropriate level of detail, contains information on more than one day, and is in a format practical for use on a construction site. The Department will also review the sample recordkeeping form when the construction EMS project is complete.

We propose to find that Rule 310 as adopted on February 16, 2000 and combined with the commitments by MCESD to make certain additional changes to the Rule, provide for the

implementation of RACM and BACM on construction sites for the 24-hour PM-10 standards.⁸⁶ We have also determined that the revised commitments do not affect our previous proposed finding that Rule 310 combined with the commitments provide for the implementation of RACM and BACM on construction sites for the annual standard. 65 FR 19964, 19980. The rule is comprehensive in scope in that each dust source is subject to a set of requirements under Rule 310 (e.g. storage piles, dirt trackout, haul truck loads, disturbed areas, earthmoving operations).

Most Stringent Measures

With respect to the CAA's "most stringent measures" requirement, the MAG plan identifies construction site fugitive dust measures either in or under consideration for inclusion in other SIPs. These measures are labeled under the categories:

- dust control plans for construction/land clearing
- dust control measures for material storage piles
- bulk material rapid stabilization
- traffic re-routing or rapid clean up of dust deposits on paved roads
- prohibition of work site unpaved haul roads/parking/staging areas
- traffic reduction/speed control plans for unpaved roads
- weed abatement operations
- require dust control plans for all grading permit activities
- implement high-wind condition BACMs

See MSM Study, Table 1-2 and Table 3-1.

Most of the potential MSMs are provisions in South Coast's fugitive dust Rule 403. The MAG plan indicates that each of the South Coast and MCESD's rules are more stringent than the other in certain respects. MAG plan, p. 10-35. The MAG plan acknowledges that Rule 403 contains more stringent control measure requirements than imposed by Rule 310. For example, Rule 403 requires that water be applied to soil not more than 15 minutes prior to moving the soil

⁸⁶ These revised commitments are currently unenforceable because they have not been adopted by Maricopa County's Board of Supervisors. We are, however, proposing to approve these commitments under CAA section 110(k)(3) as an element of the Arizona SIP because we fully expect that the Board will adopt these commitments as enforceable SIP commitments and the State will submit them as a complete SIP revision prior to our final action. However, if we do not receive the adopted commitments by the time we must take final action, we propose to conditionally approve them under CAA section 110(k)(4). If we take final action to conditionally approve these commitments, MCESD will have one year to fulfill the commitment or the approval will turn into a disapproval and we would no longer be able to find that the MAG plan provides for the implementation of BACM and the inclusion of MSM on construction sites for either the annual or 24-hour standards.

and requires open storage piles to be watered twice per hour or covered. However, the MAG plan indicates that Rule 310's 20 percent opacity limit is generally more restrictive than Rule 403's property line standard.⁸⁷ The MAG plan concludes that, on balance, Rule 310 is equally stringent compared to Rule 403's construction site requirements. We agree with this conclusion with the caveat that we believe Rule 310 and/or dust control plans require additional control measures for dust suppression. This caveat is addressed in the MAG plan's commitment to research, develop and incorporate additional requirements for dust suppression practices/equipment for construction activities into dust control plans and/or Rule 310.

The MAG plan does not discuss any construction site measures from other areas as potentially more stringent measures. Based on our work with the Las Vegas area, we have identified requirements in Clark County Health District permits that are potentially more stringent than Maricopa County's measures.⁸⁸ These measures include requiring:

- stand tanks on projects that are 10 acres or more in size,
- an additional, separate water truck when using a trencher or when screening,
- a separate water truck or pull during landscaping,
- maintaining all stockpiles in a moist condition,
- stockpiles not to exceed 8 feet in height or be within 100 yards of any occupied existing structures
- all unpaved ingress/egress and interior roads to be watered, graveled, or treated with chemical dust suppressant regardless of vehicle usage,
- surfaces to be presoaked at least one day prior to rough grading or grubbing,
- specific aggregate and apron dimensions for gravel pads on projects 5 acres or larger,
- entrances/exits to be properly graded to prevent runoff from leaving the construction site
- additional conditions for earthmoving operations > 120 acres.⁸⁹
- dust to be controlled 24 hours a day, 7 days a week

We propose to find that Maricopa County's Rule 310 provisions are sufficiently consistent with Clark County's requirements to control dust 24 hours a day, 7 days a week and to install gravel pads at all site entrances/exits on projects 5 acres or larger. We also believe that

⁸⁷ The MAG plan indicates that a 20 percent opacity fugitive dust plume typically disperses to zero visibility within 50 feet downwind of a source.

⁸⁸ These requirements are not in Clark County's fugitive dust rule, but rather are required practices in dust control permits.

⁸⁹ For example, a maximum 3:1 ratio of earthmoving equipment to water truck/pull equipment is required.

Rule 310's provision that controls only need to be applied to unpaved haul roads with over 20 vehicle trips per day is consistent with BACM and meets MSM.⁹⁰

The remaining Clark County MSMs discussed above are addressed by Maricopa County's second enforceable commitment to research, develop and incorporate additional requirements for dust suppression practices/equipment into Rule 310 and/or DCPs. In order to fulfill its commitment, MCESD will need to adopt similar measures. Due to the variety of site conditions, Clark County could be selectively enforcing or selectively enforces these MSMs because they are not or may not be appropriate in all circumstances. Therefore, we do not expect Maricopa County to adopt the MSMs from Clark County permits at this time, until they can be further evaluated for sites in the Phoenix PM-10 nonattainment area and specified for inclusion in Rule 310 and/or DCPs.

We have also identified a requirement in Imperial County Regulation VIII that is potentially more stringent than Maricopa County's measures. Imperial County Regulation VIII establishes the following requirement for bulk material handling/transfer:

- spray with water 15 minutes prior to handling and/or at points of transfer,
- chemical/physical stabilization, or
- protect from wind erosion by sheltering or enclosing the operation and transfer line.

While Maricopa County Rule 310 requires owners/operators to comply with a 20 percent opacity standard for any dust generating operation and dust control plans must include a control measure for every fugitive dust source (including bulk material handling/transfer), it does not contain specific requirements that are equivalent to the Imperial County requirements for this activity. However, watering 15 minutes prior to handling may be overly prescriptive and not necessary in all cases to meet the rule's performance standards. In researching information to meet its second enforceable commitment, should MCESD determine that watering within a specific time frame prior to handling bulk materials is necessary for some sites, this will presumably be incorporated into Dust Control Plans as warranted.

Overall, we propose to find that Rule 310 combined with MCESD's commitments provide for the inclusion of MSM for construction sites. See Footnote 86.

This section prepared by Karen Irwin.

⁹⁰ South Coast Rule 403 contains this same low-use exemption.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR AGRICULTURAL SOURCES

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criterion 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State.

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010-42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, pp. 7-153, 8-17, 10-36 through 10-37, 10-47
BMP plan

SIP Submittals: ACC R18-2-610, *Definitions for R18-2-611* and ACC R18-2-611, *Agricultural PM-10 General Permit; Maricopa PM-10 Nonattainment Area* (collectively, BMP general permit)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM guidance, the plan must identify potential BACM, including their technological feasibility, costs, and energy and environmental impacts, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is that the State “demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can feasibly be implemented in the area.” CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify the potentially most stringent measures in other implementation plans or used in practice in other

states for the significant source category and for each measure determine their technological and economic feasibility for the area, compare the potentially most stringent measures for the significant source category against the existing BACM or other measures, if any, for that source category, and include in the plan any MSM that is more stringent than existing measures and provides for implementation as expeditiously as practicable or provide a reasoned justification for rejecting the potential MSM, i.e., why such measure cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies agricultural sources (including agricultural fields and aprons) as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-1. The plan does not rely on PM-10 reductions from agricultural sources for expeditious attainment of the annual standard.⁹¹ The MAG plan, however, does rely on PM-10 reductions from agricultural sources to meet the 24-hour standard at the Gilbert and West Chandler sites. See MAG plan, p. 8-12. The Plan relies on PM-10 agricultural reductions of 20 percent for the Gilbert site and 58 percent for the West Chandler site.

The MAG plan submitted in February 2000 relies on the State's commitment in A.R.S. 49-457 to adopt BMPs as its BACM for agricultural sources. MAG plan, p. 7-156. This was ADEQ's intent when it submitted the agricultural BMP process in A.R.S. 49-457 to us as a SIP revision. Letter from ADEQ to EPA, September, 1998. The plan also relies on this statutory commitment to meet the MSM requirement in CAA section 188(e). MAG plan, p.10-25. Arizona's statutory BMP commitment was similar to the commitment we made in our PM-10 FIP. 63 FR 41326, 41350. As part of the RACM demonstration in the FIP, we promulgated a commitment, codified at 40 CFR 52.127, to ensure that RACM for agricultural sources will be expeditiously adopted and implemented. For agricultural sources, the State used a similar strategy to address the RACM, BACM and MSM requirements.

Description of Agriculture Source Category

The agriculture source category covers all dust generating activities and sources on farms and ranches in the Maricopa nonattainment area. These activities and sources include land planning, tilling, harvesting, fallow fields, prepared fields, field aprons, and unpaved roads.

⁹¹ Because the emission reductions from the Agricultural general permit rule are not needed for expeditious attainment of the annual standards, Arizona has instead chosen to use them to fulfill in part the CAA section 172(c)(9) requirement for the annual standard that nonattainment area plans provide for the implementation of contingency measures. See the section on contingency measures in this TSD.

In 1996, there were approximately 600 growers farming approximately 300,000 acres of land in Maricopa County. An estimated 63 percent of the agricultural activity in Maricopa County occurred within the nonattainment area. Upland cotton (112,000 acres), alfalfa (54,000 acres), and durum wheat (45,000 acres) comprised over two-thirds of the crop acreage in Maricopa County during 1996. Cash receipts for crops grown in 1996 totaled over \$440 million, ranking Maricopa County second in the state. See Arizona Statistics Service, August, 1997, p. 2. The area is characterized by very low rainfall (7 inches per year) and desert conditions.

Maricopa County is rapidly urbanizing with agricultural land being converted into other uses at an average rate of approximately 8,700 acres per year. BMP TSD, p. 1. As this urbanization continues to result in the withdrawal of land from agricultural production, the amount of PM-10 emissions associated with agricultural lands will decrease. The 1996 Farm Bill has also affected farming practices in the Maricopa County nonattainment area. See 16 U.S.C. 3801 et seq. After 1994, land which had been set-aside under a prior U.S. Department of Agriculture (USDA) program was placed in production, primarily alfalfa. See "Proposed Method to Account for Effects of the 1995 Farm Bill," Cathy Arthur, MAG, December, 1997. The switch from unplanted set-aside to planted alfalfa resulted in a relatively small decrease in PM-10 emissions because lands that were previously susceptible to disturbance and wind erosion would now be in a continuous cover crop, typically for a three-year period. Despite the conversion of agricultural lands to other uses and the small increase in agricultural land being put back into production, agricultural sources are expected to continue to contribute to PM-10 emissions for the foreseeable future, especially in relation to the PM-10 24-hour standard.

Emissions from Agricultural Sources in the Phoenix Area

PM-10 emissions from agricultural windblown dust and agricultural dust account for 14.9 percent and 3.3 percent respectively of the 1995 Regional PM-10 Emissions Inventory. MAG TSD, Table II-1. In 2006, agricultural sources, without additional controls, are expected to contribute a total of 7.3 percent (6 percent windblown and 1.3 percent other) to the total uncontrolled inventory. MAG TSD, Table II-3.

For purposes of the 24-hour standard, PM-10 from agricultural fields and aprons accounts for 62 percent and 7 percent respectively of the microscale impact at the monitor on the 1995 design day for the West Chandler site, and PM-10 from agricultural aprons accounts for 45 percent of the microscale impact at the monitor on 1995 design day inventory for the Gilbert site. Microscale plan, pp. 19-20.

For purposes of both standards, the percentage of agricultural land going out of production by 2006 was determined to be approximately 37 percent. BMP TSD, p. 1.

Existing Controls

On July 29, 2001, we proposed approval of the BMP general permit rule as meeting the RACM requirements of 189(a)(1)(C). 66 FR 34598. We signed the final approval on September 10, 2001.

Development of Agricultural BMP General Permit Rule

In November, 1997, EPA Region 9 staff traveled to Phoenix to begin a series of meetings with agricultural stakeholders regarding the need to address agricultural sources of PM-10 in the Agency's pending moderate area PM-10 federal implementation plan (FIP). These meetings led to a recommendation from the agricultural stakeholders for us to propose in the FIP that the agricultural sources be addressed through a stakeholder-based effort to develop BMPs. We concurred with the recommendation, and in our FIP we included an enforceable commitment to develop the BMPs. See 63 FR 41326, 41350.

On May 29, 1998, Arizona Governor Hull signed into law Senate Bill 1427 (SB 1427) which revised title 49 of the Arizona Revised Statutes (A.R.S.) by adding section 49-457. This legislation established an Agricultural Best Management Practices committee⁹² for the purpose of adopting by rule by June 10, 2000, an agricultural general permit⁹³ specifying BMPs for regulated agricultural activities⁹⁴ to reduce PM-10 emissions in the Maricopa PM-10 nonattainment area. The Committee also was required to adopt and implement an education program by June 10, 2000, and affected agricultural sources are required to implement at least one BMP by December 31, 2001. A.R.S. 49-457.A-H, M .

On September 4, 1998, the State of Arizona submitted A.R.S. 49-457 to us as a revision to the Arizona SIP. On June 29, 1999, we approved the SIP revision under section 110(k)(3) of the CAA as meeting the requirements of sections 110(a) and RACM requirements in

⁹² The Committee is composed of five local farmers, the Director of ADEQ, the Director of the Arizona Department of Agriculture, the State Conservationist for the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) state office, the Dean of the University of Arizona's College of Agriculture, and a soil scientist from the University of Arizona.

⁹³ Subsection N.1 of ARS 49-457 defines "agricultural general permit" to mean: best management practices that: (a) reduce PM-10 particulate emissions from tillage practices and from harvesting on a commercial farm.[:] (b) reduce PM-10 particulate emissions from those areas of a commercial farm that are not normally in crop production. [:] (c) reduce PM-10 particulate emissions from those areas of a commercial farm that are normally in crop production including prior to plant emergence and when the land is not in crop production.

⁹⁴ "Regulated agricultural activities" are defined as "commercial farming practices that may produce PM-10 particulate emissions within the Maricopa PM-10 particulate nonattainment area." A.R.S. 49-457.N.4.

189(a)(1)(C) and withdrew the FIP RACM commitment for such sources. A copy of A.R.S. 49-457 can be found in the docket for this rulemaking.

As directed by ARS 49-457, the Agricultural BMP Committee adopted the agricultural general permit and associated definitions, effective May 12, 2000, at Arizona Administrative Code (AAC) R18-2-610, "Definitions for R18-2-611," and 611, "Agricultural PM-10 General Permit; Maricopa PM10 Nonattainment Area" (collectively, general permit rule). On July 11, 2000, the State submitted AAC R18-2-610 and 611 as a revision to the Arizona SIP.

In addition to fulfilling the commitment in ARS 49-457, the July 2000 submittal was intended to partially satisfy the CAA's serious area PM-10 planning requirements; the State indicated that documentation for the remaining portions of the serious area SIP revision package would be submitted at a later date. See letter, Richard W. Tobin II, ADEQ, to Felicia Marcus, "Maricopa County PM10 State Implementation Plan Revision: Agricultural Best Management Practices," July 11, 2000.

On April 26, 2001, the State submitted this additional documentation as part of a draft revision to the 1999 serious area plan and requested parallel processing, a procedure to expedite review of a state plan. See 40 CFR part 51, appendix V, section 2.3.1. The State formally submitted the final revision to us on June 13, 2001. This submittal includes among other things, a description of the public education initiative for the general permit, quantification of the emission reductions from the general permit rule, and a demonstration that the CAA section 110 general requirements have been met for the rule. As stated above, on July 29, 2001, we proposed approval of the general permit rule as meeting the requirements of 189(a)(1)(C) for RACM. 66 FR 34598. We signed the final approval on September 10, 2001.

Summary of general permit rule and public education initiative

The BMP general permit rule requires a commercial farmer⁹⁵ to implement by December 31, 2001 at least one BMP for three categories of emission sources: tillage and harvest, non-Copeland, and Copeland.⁹⁶ Table AG-1 lists the thirty-four BMPs approved by the BMP

⁹⁵ R18-2-610 defines commercial farmer as "an individual, entity, or joint operation in general control of 10 or more continuous acres of land used for agricultural purposes within the boundary of the Maricopa County PM10 nonattainment area."

⁹⁶ R18-2-610 defines tillage and harvest as "any mechanical practice that physically disturbs cropland or crops on a commercial farm." R18-2-610 defines non-cropland as "any commercial farm land that: is no longer used for agricultural production; is no longer suitable for production of crops; is subject to a restrictive easement or contract that prohibits use for the production of crops; or includes a private farm road, ditch, ditch bank, equipment yard, storage yard, or well head." R18-2-610 defines cropland as "land on a commercial farm that: is within

Committee as feasible, effective, and common sense practices that will reduce PM-10 emissions while minimizing negative economic impacts on local agriculture.⁹⁷

For enforcement purposes, a commercial farmer is required to maintain a record demonstrating compliance with the general permit. A commercial farmer not in compliance with the general permit is subject to a series of compliance actions described in ARS 49-457.I-K.

TABLE AG-1 LIST OF BMPs IN THE AGRICULTURAL GENERAL PERMIT	
CATEGORY	BEST MANAGEMENT PRACTICES
Tillage and Harvest Activities	Chemical Irrigation Combining Tractor Operations Equipment Modification Limited Activity During High-wind Event Multi-year Crop Planting Based on Soil Moisture Reduced Harvest Activity Reduced Tillage System Tillage Based on Soil Moisture, or Timing of Tillage Operation.
Non-Copeland	Access Restriction Aggregate Cover Artificial Wind Barrier Critical Area Planting Manure Application Reduced Vehicle Speed Synthetic Particulate Suppressant Track-out Control System Tree, Shrub, or Windbreak Planting, or Watering.
Copeland	Artificial Wind Barrier Cover Crop Cross-wind Ridges Cross-wind Strip-cropping

the time frame of final harvest to plant emergence; has been tilled in a prior year and is suitable for crop production, but is currently fallow; is a turn-row.”

⁹⁷ R18-2-610 defines a BMP as “a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible and effective in reducing PM-10 particulate emissions from a regulated agricultural activity.”

TABLE AG-1 LIST OF BMPs IN THE AGRICULTURAL GENERAL PERMIT	
CATEGORY	BEST MANAGEMENT PRACTICES
Tillage and Harvest Activities	Chemical Irrigation Combining Tractor Operations Equipment Modification Limited Activity During High-wind Event Multi-year Crop Planting Based on Soil Moisture Reduced Harvest Activity Reduced Tillage System Tillage Based on Soil Moisture, or Timing of Tillage Operation.
	Cross-wind Vegetative Strips Manure Application Mulching Multi-year Crop Permanent Cover Planting Based on Soil Moisture Residue Management Sequential Cropping Surface Roughening, or Tree, Shrub, or Windbreak Planting.

The BMP Committee developed and began implementing in June 2000 an Agricultural BMP General Permit Education Program to inform and educate the public and growers about the forthcoming general permit. As of July 2000 nine public presentations had been given in addition to the twenty-two public meetings held by the BMP Committee, including, informational public workshops for growers held on February 20, 2001 and March 1, 2001. BMP TSD, pp. 31-33. The workshops focused on the purpose of the rule, the individual BMPs, record keeping requirements, and compliance options. ADEQ plans to hold an annual workshop to educate growers, inspectors, and interested stakeholders. Finally, in addition to the guide referenced above, the BMP Committee developed a brochure to inform the public and growers about PM-10 and the BMPs. See Governor's Agricultural BMP Committee, "How Agriculture is Improving Maricopa County's Air Quality," March, 2001.

Does the Plan meet the statutory and policy requirements?

For the reasons discussed below, we propose to find that the State's BMP general permit rule meets the CAA's section 189(b)(1)(B) and in section 188(e) requirements to provide for the implementation of BACM by June 10, 2000 and for the inclusion of MSM. Today's proposed

finding is applicable to both the annual and 24-hr standards. It revises our previous proposed finding in the annual standard proposal that the State's commitment in the MAG plan to adopt and implement agricultural BMPs meets the CAA's requirements for BACM and MSM by substituting the BMP general permit rule. 65 FR 19964, 19981.

The State's BACM Analysis

1. Initial identification of potential BACM for agricultural sources

The MAG plan, submitted in 2000, included discussions of PM-10 control strategies identified (pp. 5-66 to 5-72) and measures recommended in February, 1997 by the Maricopa County Farm Bureau (pp. 6-12 to 6-13). These recommended measures pre-date the BMP Committee's efforts and were included among the measures evaluated during the BMP process. A history of these potential measures is provided below. See also BMP TSD, pp. 9-14.

Identification of potential BACM began when MAG hired Sierra Research to develop a list of control measures for consideration. The objectives of the Sierra Research study were to: 1) review available guidance from EPA and others to identify PM-10 sources that significantly impact monitoring stations recording violations of the KNACKS; 2) select control measures that are applicable to those sources; 3) analyze the selected control measures for emission reduction impacts, cost and cost-effectiveness. See, Sierra Research, "Particulate Control Measure Feasibility Study," January 24, 1997, p. 1-1. The 1997 Sierra Research study identified the following five potential PM-10 control requirements for agricultural sources:

- Soil conservation requirements of the U.S. Food Security Act;
- Restrictions on tilling or soil mulching during high wind events;
- Fallow treatment (cover crop or grass revegetation of irrigated fields, maintenance of crop residues on non-irrigated fields, mowing for weed control);
- Require comprehensive dust control plans for farms larger than 640 acres (including surface treatment, vegetative cover, and windbreaks);
- Reduce emissions of ammonia and nitrates from agricultural operations.

1997 Sierra Research Study, Table 1-2.

As a next step in selecting BACM, MAG evaluated various control measures to develop a more comprehensive list of potential BACM. MAG utilized the Sierra Research study, the Governor's Air Quality Task Force, previous MAG plans, air quality plans from other nonattainment areas, and other sources to identify the following draft comprehensive list of potential BACM control requirements:

- Cover crops - planting alternative crops during fallow period.
- Vegetation establishment - conversion of crops to grassland or trees on land not suitable for continuous cropping.

- Windbreaks - planting trees or grass perpendicular to the prevailing wind.
- Restrictions on tilling or mulching during high wind events.
- Reduce emissions of ammonia and nitrates from agricultural operations.
- Provide for burial of whole stalks during lowdown (if research documents no increase in spread of plant disease or pests from this practice).
- Require comprehensive dust control plans for farms larger than 640 acres - including windbreaks, maintenance of crop residues on non-irrigated fields, mowing for weed control.
- Soil conservation requirements of the U.S. Food Security Act.

MAG plan, p. 5-5 and Table 5-2.

To select the final list of BACM control requirements, MAG worked with stakeholders to review the potential agricultural measures. As a result of input from the Maricopa County Farm Bureau, the list was revised to include the following potential requirements:

- Incentives and credits for use of improved agricultural practices.
- Tilling restrictions on high wind days and tillage irrigation where feasible.
- Reduce emissions of ammonia and nitrates from agricultural operations.
- Cooperative development of management practices to reduce emissions from agricultural activities.
- Deep furrowing of fallow fields.
- Provide burial of whole stalks during lowdown.

MAG plan, pp. 6-13 to 6-14.

For the Microscale plan, ADEQ determined assistance was needed to evaluate additional reduction strategies to address the short-term impacts of agricultural sources. In order to identify potential agricultural control requirements to address the 24-hour standard at the West Chandler and Gilbert sites, ADEQ contracted ENG. to contact a BACM analysis. The analysis consisted of identifying agricultural control requirements, including a survey of nonattainment areas in the west, and an exhaustive study of the effectiveness of the controls. The ENSR report identified the potential agricultural control requirements listed below. See ENSR, "Evaluation of Fugitive Dust Control in the Maricopa County PM-10 Nonattainment Area," March 1997, found in Appendix B to the Microscale plan.

For windblown dust from agricultural fields:

- Tree windbreaks
- Conservation tillage practices, such as leaving vegetative cover between crops
- Sprinkler irrigation to maintain crust on surface

For windblown dust from agricultural aprons:

- Wind fence
- Tree windbreaks
- Mulch or vegetative cover
- Chemical stabilizers.

ENSR Report, p. 4-8.

ENSR also noted that agencies are generally restricted by state law from requiring agricultural operations to obtain air quality permits but that the South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Unified Air Pollution Control District did have or were planning to implement agricultural related control programs. ENSR Report, p.3-2.

2. Identification of BACM by the BMP Committee

In September 1998, the Agricultural BMP Committee was established for the purpose of developing an agricultural general permit specifying the implementation of BMPs. BMP TSD, p. 4. The BMP Committee established an Ad-hoc Technical Group to develop a comprehensive list of potential BMPs for regulated sources in the Maricopa nonattainment area. Participants on the Ad-hoc Group included the USDA NRCS, USDA Agricultural Research Service, University of Arizona College of Agriculture, ADEQ, University of Arizona College of Agriculture and Cooperative Extension, Western Growers Association, Arizona Cotton Growers Association, Arizona Farm Bureau Federation, and EPA. BMP TSD, p. 15.

The Ad-hoc Technical Group reviewed available dust control regulations, literature, and technical documents, and developed a list of conservation practices potentially suitable to agricultural sources in the Maricopa County nonattainment area. The information sources evaluated are listed below in Table AG-2.⁹⁸

⁹⁸ Potential BACM control requirements previously identified for consideration (i.e., in the 1997 Sierra Research study, 1997 ENSR Report, and Revised MAG 1999 Plan) were included within the comprehensive list of BMP's evaluated by the Committee.

TABLE AG-2
PRIMARY INFORMATION SOURCES USED TO DEVELOP
A LIST OF CONSERVATION PRACTICES
WITH POTENTIAL APPLICABILITY IN MARICOPA COUNTY

NRCS Field Office Technical Guide.

South Coast Air Quality Management District
Rule 403 (fugitive dust) Agricultural Handbook.

San Joaquin Valley Unified Air Pollution Control District
1997 PM-10 Attainment Demonstration Plan.

University of Arizona Cooperative Extension
Mojave Valley research project

University of Washington Columbia Plateau research project.

ENSR Report: Evaluation of Fugitive Dust Control in the
Maricopa County PM-10 Nonattainment Area. March 1997.

From a review of these information sources, 65 potential practices were selected for further consideration. BMP TSD, p. 16. These 65 practices represented a broad spectrum of potential BMPs, many of which related to conservation practices used in the western United States that had never been evaluated in the context of reducing PM-10. This list represented potential practices to be considered in determining which could actually be implemented in the Phoenix area.

The Agricultural BMP Committee thoroughly reviewed the potential practices presented by the Ad-hoc Technical Group and evaluated the potential BMPs using available information on technological feasibility, costs, and energy and environmental impacts. After an analysis of the limited information available and numerous public discussions, the Committee decided to include 34 of the 65 BMPs in the general permit rule and divided these 34 BMPs into the three categories of farm activities specified in A.R.S. 49-457.N: 10 BMPs were applicable to the Tillage and Harvest category; 10 BMPs were applicable to the Non-Cropland category; and 14 BMPs were applicable to the Cropland category. See BMP TSD, 17. In selecting these BMPs, the Committee deemed them to be feasible, effective and common sense practices for the Phoenix area which minimized potential negative impacts on local agriculture.

Of the 31 potential BMPs eliminated, the majority were dropped because they either duplicated another BMP or did not reduce PM-10. Other reasons for elimination included the

impracticability of a BMP for the Maricopa County Area, lack of cost effectiveness, or infeasibility of implementation. See June 13, 2001 BMP submittal, Enclosure 3, Attachment 8. Examples of how potential BMPs were eliminated for these reasons are provided below:

(1) *No identifiable relation to PM-10 emission reductions.* For example, the original list of potential BMPs developed by the Ad-hoc Technical Committee included a potential BMP for tree/shrub pruning. Although the tree/shrub pruning might qualify as a BMP for some agricultural activities, it would not reduce PM-10; therefore, tree/shrub pruning was dropped.

(2) *Duplication.* Many similar BMPs were combined into a single BMP. For example, the original list of potential BMPs included numerous practices that relate to creating a barrier (i.e., tree/shrub establishment, windbreak/shelterbelt establishment, windbreak/shelterbelt renovation, hedgerow plating, herbaceous wind barriers) to reduce the impact of wind on disturbed soils. These practices were combined into a single BMP: tree, shrub, or windbreak planting.

(3) *Impracticability to Maricopa County farming or implementation infeasibility.* Some of the potential BMPs were determined to be impractical or infeasible. For example, the original list included Wildlife Upland Habitat Management. This conservation practice is intended to create, maintain, or enhance habitat suitable to sustaining desired kinds of upland wildlife.⁹⁹ Although evaluated as a potential BMP, it was determined to be impracticable for Maricopa County given that the agricultural sources in question are not located in an area suitable for upland wildlife.

At the time the BMP Committee was developing the general permit rule, there was very limited information available concerning technological feasibility, costs, and energy and environmental impacts. Although the Committee determined that all the selected BMPs were technologically feasible control requirements, it found that calculating the other impacts on a commercial farmer was difficult. Because of the variety, complexity, and uniqueness of farming operations in Maricopa County, the Committee concluded that farmers need a variety of BMPs in each of the three categories of agricultural activities to choose from in order to tailor PM-10 controls to their individual circumstances. Further, the BMP Committee acknowledged that there is a limited amount of scientific information available concerning the emission reduction and cost effectiveness of some BMPs, especially in relation to Maricopa County. The BMP Committee balanced the limited scientific cost effectiveness information with the common sense recognition that the BMPs would reduce wind erosion and the entrainment of agricultural soils, thereby reducing PM-10. As a result, and given the myriad factors that affect farming operations, the BMP Committee concluded that requiring more than one BMP for each of the three agricultural categories could not be considered technically justified and could cause an

⁹⁹ USDA NRCS, Arizona; Conservation Practice Summary; Air Quality (cropland - irrigated), FOTG Section IV, November, 1998.

unnecessary economic burden to farmers. Instead, the BMP Committee and ADEQ committed to monitor the effectiveness of the BMPs and adjust the program, if needed, in the future. BMP TSD, p. 18.

3. EPA's Proposed BACM finding

The general permit rule, as finally adopted by the BMP Committee in May 2000 as BACM and MSM, requires that commercial farmers implement at least one BMP for the tillage and harvest, cropland, and non-cropland categories by December 31, 2001.

We define a BACM-level of control to be, among other things, the maximum degree of emission reduction achievable from a source or source category which is determined on a case-by-case basis, considering energy, economic and environmental impacts. Addendum at 42010. Based on the BMP Committee's findings regarding technological feasibility and economic effects of requiring more than one BMP per category, we believe that the BMP rule provides the maximum degree of emission reductions achievable from the agriculture source category in the Phoenix area and, therefore, meets the BACM requirement in section 189(b)(1)(B).¹⁰⁰

Even though the general permit rule allows a farmer to choose from a list of BMP options in each activity category, we believe that this approach represents an acceptable form of BACM. A requirement that an individual source select one control method from a list, but allowing the source to select which is most appropriate for its situation, is a common and accepted practice for the control of dust. For example, in our PM-10 FIP for Phoenix, we promulgated a RACM rule applicable to, among other things, unpaved parking lots, unpaved roads and vacant lots. The rule allowed owners and operators to choose one of several listed control methods (e.g., pave, apply chemical stabilizers or apply gravel). 40 CFR 52.128(d). In the case of the FIP, those subject to

¹⁰⁰We also consider a BACM-level control as going beyond existing RACM-level controls, such as expanding use of RACM (e.g, paving more miles of unpaved roads). Addendum at 42013. As noted previously, we have approved the BMP general permit rule as meeting the RACM requirement in CAA section 189(a)(1)(C). In the proposal for that action, we stated our belief "that the general permit rule represents a comprehensive, sensible approach that meets, and in fact far exceeds, the RACM requirements of CAA section 189(a)(1)(C) and EPA guidance interpreting those requirements." 66 FR 34598, 34602. Moreover, we explained that the State also intended the general permit rule and its enabling legislation to meet the CAA's serious area requirements. 66 FR 34598, 34599. Thus today's proposal that the general permit rule meets the BACM and MSM requirements of the Act is consistent with our prior action.

the fugitive dust rule were given a choice of control methods in order to accommodate their financial circumstances.¹⁰¹

Allowing sources the discretion to choose from a range of specified options is particularly important for the agricultural sector because of the variable nature of farming. As a technical matter, neither we nor the State is in a position to dictate what precise control method is appropriate for a given farm activity at a given time in a given locale. The decision as to which control method from an array of methods is appropriate is best left to the individual farmer. Moreover, the economic circumstances of farmers vary considerably. As a result, it is imperative that flexibility be built into any PM-10 control measure for the agricultural source category.

We believe that the work of the BMP Committee resulted in the timely adoption of the general permit and educational programs that requires BACM implementation on a schedule that will allow time for the agricultural community to understand and select appropriate BMPs and to transition to new practices, some of which may involve the purchase of new equipment. Based on these factors, we believe that the BMP implementation schedule is as expeditious as practicable and meets the BACM implementation deadline for the Phoenix area of June 10, 2000.

The development of the general permit rule was a multi-year endeavor involving an array of experts in agricultural practices. These experts considered key local factors, such as regional climate, soil type, growing season, crop type, water availability, and relation to urban centers, in the development of the general permit rule. Based on the available scientific and cost information, we believe that the general permit rule fulfills the State's commitment in A.R.S. 49-457 to adopt BACM for agricultural sources for both the annual and 24-hr standards and represents a comprehensive, sensible approach that meets the BACM requirements of CAA section 189(a)(1)(C) and our guidance interpreting those requirements.

The State's Most Stringent Measure Analysis

The South Coast Air Basin (SCAB) in California is the only other PM-10 nonattainment area in the nation that is currently requiring agricultural sources to reduce PM-10 emissions. The

¹⁰¹See also South Coast Rule 403 (providing for alternative compliance mechanisms for the control of fugitive dust from earthmoving, disturbed surface areas, unpaved roads etc.); and South Coast Rule 1186 (requiring owners/operators of certain unpaved roads the option to pave, chemically stabilize, or install signage, speed bumps or maintain roadways to inhibit speeds greater than 15 mph). We proposed to approve these South Coast rules as meeting the RACM and/or BACM requirements of the CAA on August 11, 1998 (63 FR 42786) and took final action approving them on December 9, 1998 (63 FR 67784). See also the approval of MCESD Rule 310 as meeting the RACM/BACM requirements (62 FR 41856, August 4, 1997) and the proposal to approve updated Rule 310 and MCESD Rule 310.01 as meeting the same requirements (65 FR 19964, April 13, 2000).

SCAB includes the agricultural areas of western Riverside County and the Coachella Valley for which the SCAQMD has adopted Rules 403.1 and 403 to reduce PM-10 emissions from agricultural sources. These rules, respectively, require cessation of tilling on high winds days and soil erosion plans and represent the potential MSM for agricultural sources identified by the State. MSM study, pp. 4-21 to 4-24 and pp. 4-30 to 4-32.

1. South Coast's Rule 403.1 (Wind Entrainment of Fugitive Dust)

South Coast's 403.1, "Wind Entrainment of Fugitive Dust," applies only in the Coachella Valley (Palm Springs) portion of the SCAB and requires that, when wind speeds exceed 25 miles per hour (mph), agricultural tilling and soil mulching activities should cease. While the measure applies throughout the year, the high wind days tend to occur during a high-wind season that extends between April and June. The Coachella Valley typically experiences high winds on 47 days of the year. MSM study, pp. 4-23. MAG estimated that there were a total of 37 hours, representing 11 days, with wind speeds greater than 15 mph in 1995 in Maricopa County. MAG TSD, Appendix II, Exhibit 7, p. 2.

The BMP general permit rule includes "limited activity during high wind event" as one of ten BMPs that a grower can choose for the Tillage and Harvest category. According to an analysis by Sierra Research, postponing tilling on high wind days would reduce emissions by 72 percent on high-wind days. MSM study, p. 4-23. However, because only 15 percent of the Maricopa County PM-10 nonattainment area tilling occurs during the high wind season (March through September) and because less than 4 percent of the days during this period experience winds greater than 15 mph, the air quality benefits of the measure would be small (i.e., 0.08 metric tons per average annual day in 1995) for the annual standard. MSM study, p. 4-23. Emissions from tilling are a very small contributor to total agricultural emissions on the 1995 design day (which was a high-wind day), representing just 1.6 percent of all agricultural emissions and are not implicated in 24-hour exceedances. Ag Quantification TSD, p. 3-11 and Microscale plan, pp. 18 - 19. Moreover, based on the limited amount of information available regarding the control efficiencies for the ten BMPs in the Tillage and Harvest category, the control efficiency for "limited activity during high-wind event" is on average as effective or less effective than the other BMPs in this category. Ag Quantification TSD, pp. 2-8 to 2-10.

2. South Coast's Rule 403 (Fugitive Dust)

South Coast's Rule 403, "Fugitive Dust," requires the implementation of conservation practices to reduce PM-10 from agricultural sources. Under Rule 403(h), agricultural operations exceeding 10 acres within the SCAB are exempt from the rule's requirements for fugitive dust if the farmer implements the conservation practices in the most recent Rule 403 Agricultural Handbook. See "Rule 403 Agricultural Handbook: Measures to Reduce Dust from Agricultural Operations in the South Coast Air Basin," South Coast AQMD, December 1998 (the Handbook). Because the requirements of Rule 403 are more stringent than the practices in the Handbook, it is

assumed that farmers will always choose to comply with the latter's provisions. Thus the Handbook, rather than Rule 403 itself, is effectively the potentially most stringent measure.

For a variety of reasons, it is difficult to directly compare the requirements in the general permit with the practices in the Handbook. First, the South Coast did not attempt to estimate the reductions and cost from each conservation practice included in its June 1999 "Guide to Agricultural PM10 Dust Control Practices."¹⁰² Second, the types of crops grown in Maricopa County and the South Coast area differ significantly. For example, cotton is a dominant crop in Maricopa County but is not grown in the SCAB. Third, the Handbook allows a grower to substitute a local ordinance for the three conservation practices required for "inactive" agricultural land; however, the minimum requirements for the local ordinance are not specified. Handbook, section II, p.4. Fourth, the general permit rule and the Handbook also differ in terms of exemption and waivers. The general permit rule does not exempt any crop types or provide a waiver option, but the Handbook exempts orchards, vine crops, nurseries, range land, and irrigated pastures from requiring a practice for the active and inactive categories. Finally, the Handbook also allows farmers to request a waiver if the farmer cannot apply the required practices or a verifiable alternative.

While the general permit rule divides agricultural activities into three categories and the Handbook divides them into six, and the terminology used is different, the categories of activities covered are essentially coterminous. Cf. Handbook, section I and ACC R18-2-610.7, .12, .22, .33. However, depending on the type of farming operation, the general permit rule would require implementation of at least one BMP for each of the Tillage and Harvest, Cropland, and Non-Cropland categories and the Handbook requires from one to three practices for its six agricultural categories.

In assessing South Coast's requirements for the purpose of developing the BMP general permit rule to meet the CAA's BACM requirements, the BMP Committee and ADEQ determined that because of the lack of adequate technical information concerning BMP costs and effectiveness, requiring at least one BMP for the three agricultural categories adequately addressed agricultural sources for the agricultural sources of PM-10 in the Maricopa County nonattainment area. ADEQ concluded that:

The agricultural general permit cannot mirror South Coast Rule 403 for a variety of reasons. One main reason is that agriculture in Maricopa area is primarily flood irrigated. The South Coast has dryland, irrigated, and sprinkler irrigated agriculture. The actual amount of irrigation water and frequency of irrigation can effect wind erosion estimates and the effectiveness of different control measures

¹⁰² In June 1999, South Coast published its "Guide To Agricultural PM10 Dust Control Practices." The guide contained the same practices described in the Handbook, but also included photographs and additional information to educate growers about practices to reduce PM10.

under different conditions. Therefore, the BMPs for Maricopa County were based on practical applications during those times when the fields were not flooded. Also, because the application of more than one BMP at a time for a selected category would only provide incremental PM-10 reductions, sometimes at an uneconomical cost, flexibility was provided in the rule to allow the expert (the farmer) to decide what BMP should be applied when and where.

See BMP TSD, p. 27.

As discussed above, in the BACM section of this TSD, and as we concluded in its original FIP measure for the agricultural sector (63 FR 41332), the BMP Committee found that, because of the variety, complexity, and uniqueness of farming operations and because agricultural sources vary by factors such as regional climate, soil type, growing season, crop type, water availability, and relation to urban centers, agricultural PM-10 strategies must be based on local factors. Therefore, the general permit rule, as finally adopted by the BMP Committee in May 2000, reflects the conclusion of the BMP Committee that farmers need a variety of BMPs to choose from in order to tailor PM-10 controls to their individual circumstances. Further, the BMP Committee acknowledged that there is a limited amount of scientific information available concerning the emission reduction and cost effectiveness of some BMPs, especially in relation to Maricopa County. The BMP Committee balanced these limitations with the common sense recognition that the BMPs would reduce wind erosion and the entrainment of agricultural soils, thereby reducing PM-10.

While the Committee surveyed measures adopted in other geographic areas, these measures were of limited utility in determining what measures are available for the Maricopa County area. Given the limited scientific information available and the myriad factors that affect farming operations, the BMP Committee concluded that requiring more than one BMP could not be considered technically justified and could cause an unnecessary economic burden to farmers. Adding to concerns about the economic feasibility of requiring more BMPs per farming activity is the general uncertainty regarding the cost of the BMPs and continued viability of agriculture in Maricopa County. Between 1987 and 1997, the number of farms operating in Maricopa County declined by approximately 30 percent and the amount of land farmed declined by approximately 50 percent. This trend is expected to continue. Finally, in order to justify additional requirements for farming operations in the area beyond those in the general permit rule, the BMP Committee determined that a significant influx of money and additional research would be needed.

Based on all of these factors, the BMP Committee concluded that the Handbook's practices were neither technologically nor economically feasible for agricultural sources in Maricopa County and therefore are not feasible for the Phoenix area. BMP TSD, p. 18.

3. EPA's Proposed Most Stringent Measure Finding

We agree with the analysis of the BMP Committee. As noted previously, the development of the general permit rule was a multi-year endeavor involving an array of agricultural experts familiar with Maricopa County agriculture. Maricopa County is only the second area in the country where formal regulation of PM-10 emissions from the agricultural sector has ever been attempted. For the reasons discussed above, we propose to conclude that the BMP general permit rule meets or exceeds the stringency of South Coast Rule 403.1's requirement for cessation of tilling during high winds. Based on the forgoing analysis of the Handbook, we also propose to conclude that the Handbook's requirements are neither technologically nor economically feasible for Maricopa County. Because all the identified potential MSM have either not been demonstrated to be more stringent than existing Maricopa County controls or found to be infeasible for the area, we propose to find that the MAG plan provides for the inclusion of MSM as required by CAA section 188(e) to our satisfaction.

Quantification of the Emission Reductions from the BMP General Permit Rule

ADEQ contracted URS to assist in determining the expected reductions from the general permit rule. URS report is found in Enclosure 3, Attachment 5 of the June 13, 2001 SIP submittal.

The process URS used to develop an emission reduction estimate for the general permit rule is:

1. Determine applicability of each BMP to the major crops in Maricopa County;
2. Rank the BMPs based upon their likelihood of use for each major crop;
3. Determine control efficiencies for individual BMPs; and
4. Estimate emission reductions from application of BMPs.

Factors influencing which the applicability of any given BMP to a given crop include technical feasibility and crop switching. Ag Quantification TSD, p. 2-5. BMP applicability is shown in Table 2-1 in the Ag Quantification TSD.

USR asked members of the agricultural community to rank each BMP within each activity category on a scale from 1 to 10 from most-likely to least-likely to be implemented. Factors influencing the likelihood of implementation are economic feasibility, the ability to achieve the greatest amount of PM-10 reductions, and farm ownership. Ag Quantification TSD, p. 2-5. Rankings are shown in Table 2-2 in the Ag Quantification TSD.

USR reviewed a wide range of documents to determine control efficiencies for the BMPs. Ag Quantification TSD, Appendix A. The estimated emission reductions from individual BMPs vary widely. See Ag Quantification TSD, Table 2-2. For example, USR identified nine studies that included an estimate of the control efficiency when applying a reduced tillage system. The reductions ranged from 25-100 percent. For BMP with ranges of control efficiencies, a maximum, minimum, and mid-point control efficiency were established. Finally, the net

maximum, minimum, and mid-point control efficiencies were calculated for each BMP by combining the researched control efficiency, a 80 percent compliance rate, and the relevancy factor (that is, the percent of farmers that will use the given BMP that was established in step 2). See Ag Quantification TSD, Table 2-3.

Finally, for each agricultural activity, the net maximum, minimum, and mid-point control efficiencies were applied to design-day (April 9, 1995) emission estimates, adjusted for a 37 percent loss in agricultural lands between 1995 to 2006. The result is the estimated maximum, minimum, and mid-point emission reductions from the general permit rule for 2006. See Ag Quantification TSD, Table 4-2. The mid-point emission reductions were used for the 24-hour standard attainment demonstration. Ag Quantification TSD, p. 4-5.

The agriculture source category is widely diverse, with many types of emission sources. Also diverse are the control requirements that can be applied to these emission sources. Given this context, the approach taken in the MAG plan to calculate the emission reductions from the agricultural general permit rule (especially, the proportioning of emission reduction from each BMP based on the likelihood of its use) is appropriate and consistent with how emission reductions are estimated from other fugitive dust rules where there are multiply compliance options.

This section prepared by John Ungvarsky, Jan Taradash, and Frances Wicher.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR RESIDENTIAL WOOD COMBUSTION

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10. sources.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approval

Primary Guidance Documents: BACM: *Addendum*, pp. 42010-42014
MSM: Section 3 of this TSD
Technical Information Document for Residential Wood Combustion Best Available Control Measures, EPA-450/2-92-002 (September 1992)

Primary Plan Cites: Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source category including each measure's technological feasibility, costs, and energy and environmental impacts, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State "demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area." CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area as necessary, compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source

category, and provide for the adoption of any MSM that is more stringent than existing measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies residential wood combustion as a significant source of PM-10 in the Phoenix area. MAG Plan, Table 9-1.

Description of Residential Wood Combustion Source Category

The residential wood combustion (RWC) category includes emissions from the burning of solid fuel in residential fireplaces and woodstoves as well as barbecues and firepits. 1994 Regional PM-10 Inventory, p. 4-1.

Emissions from Residential Wood Combustion in the Phoenix Area

Residential woodburning contributes 0.87 metric tons per average annual day or 0.6 percent of the total directly-emitted, non-windblown 1994 PM-10 inventory (1994 Regional Inventory, Table 2-3) and 0.7 percent of the 2006 pre-control total (including windblown) PM-10 inventory (MAG plan TSD, Table II-3). Residential woodburning contributes more to the overall inventory during the winter months. Total uncontrolled woodburning emissions increase by more than 40 percent from 1995 to 2006. (MAG plan TSD, Tables II-1 and II-3).

Existing controls

1. National controls

Nationally, we have established PM-10 emission limits for new woodstoves and fireplace inserts. All woodstoves manufactured on or after July 1, 1990, or sold on or after July 1, 1992 must meet Phase II emission limits. (See Standards of Performance for New Residential Wood Heaters, 40 CFR part 60, subpart AAA.)

2. Local controls

MCESD Rule 318 "Approval of Residential Woodburning Devices" (revised April 21, 1999) and Residential Woodburning Restriction Ordinance (revised November 17, 1999) implement a mandatory woodburning curtailment program. The curtailment program restricts the types of woodburning devices that can be used during periods of high PM-10 concentrations. We approved Rule 318 and an earlier version of the ordinance (revised April 21, 1999) into the SIP as RACM. See 64 FR 60678 (November 8, 1999). Rule 318 establishes standards for the approval of residential woodburning devices that can be used during restricted-burn periods. The

SIP-approved ordinance provides that restricted-burn periods are declared by the Control Officer when the Control Officer determines that air pollution levels could exceed the CO standard and/or the PM standard ($150 \mu\text{g}/\text{m}^3$). MCESD revised the ordinance on November 17, 1999 to allow the Control Officer to declare restricted-burn periods when the particulate matter pollution levels could exceed the “particulate matter no-burn standard” of $120 \mu\text{g}/\text{m}^3$.

Does the plan meet the statutory and policy requirements?

Suggested Measure List for BACM and MSM Analysis

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for residential wood combustion including potential most stringent measures from other States as well as provides information on their technological feasibility, costs, and energy impacts when appropriate.

The suggested measures in the MAG plan for controlling emissions from residential wood combustion are listed in Table RWC-1.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls.

As demonstrated in Table RWC-1, the overall residential woodburning restriction program is strengthened and goes beyond the existing program, which we have previously found to provide for the implementation of RACM. See 64 FR 60678 (November 8, 1999). Both strengthening and expanding existing programs are key criteria for demonstrating the implementation of BACM. See *Addendum* at 42013. Where the MAG plan has rejected potential BACM, it provides a reasoned justification for the rejection.

The MAG plan identified a number of potential MSM for residential wood combustion. See RWC-1. The plan does not provide for the adoption of any of these measures but provides reasoned and acceptable justifications for their rejection. Therefore, we propose to find that the MAG plan provides for the inclusion of MSM.

1. Approval of Residential Woodburning Restriction Ordinance

On November 17, 1999, Maricopa County revised its woodburning ordinance to lower the criteria for declaring a restricted-burn period. As revised, the Control Officer will declare a restricted-burn period when particulate matter pollution levels could exceed $120 \mu\text{g}/\text{m}^3$. (“particulate matter no-burn standard”). Arizona submitted the revised ordinance as a SIP revision on January 28, 2000. We found it complete on March 31, 2000. This submitted ordinance is more stringent than the version of the ordinance that we approved into the SIP on November 8, 1999. See 64 FR 60678. Because approving this revision will strengthen the SIP,

we are proposed to approve it into the SIP as part of the proposal on the annual standard. 65 FR 19964, 19990.

The BACM guidance for RWC suggests that a curtailment program be implemented in two stages where the woodburning restrictions are less severe in the first stage, which is called at lower PM levels. In the first stage, the program could allow exemptions for EPA-certified stoves or equivalent, sole source of heat, and low-income households. In the second stage, exemptions should be limited to low-income households. Maricopa's current program is a single stage program that allows the use of EPA-certified stoves or equivalent during curtailment periods and provides for sole source of heat and inadequate alternate source of heat exemptions.

TABLE RWC-1 ANALYSIS OF BACM AND MSM FOR RESIDENTIAL WOOD COMBUSTION		
SUGGESTED MEASURE	ADOPTED? IF NO, OK?	DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
SUGGESTED BACM		
Public awareness and education	Yes	MCESD established a Public Information Program and developed a booklet and brochure to inform the public about pollution from residential wood combustion. The County is also coordinating with the Regional Public Transportation Authority's High Pollution Advisory program. The County allocates \$30,000 to the woodburning program including the public information program. RPTA uses its existing funding. See MAG Plan, pp. 7-64 to 7-66. Maricopa County Commitment, measure 8 and RPTA commitment, measure 97-TC-15.
Mandatory curtailment during predicted periods of high PM-10 concentrations	Yes (partial)	MCESD has adopted Rule 318 (Approval of Residential Woodburning Devices) and the Residential Woodburning Restriction Ordinance which implement a mandatory curtailment program that restricts the types of woodburning devices that can be used during periods of high PM-10 concentrations. The curtailment program is a single stage program that prohibits the operation of unapproved woodburning devices when the Control Officer determines that PM levels could exceed the "particulate matter no-burn standard" of 120 µg/m ³ . The Control Officer may grant exemptions for sole source of heat (permanent, temporary, or emergency) and for inadequate alternate source of heat. Approved woodburning devices (EPA-certified, Phase II wood stoves or equivalent, pellet stoves, and gas burning devices) may be operated during restricted-burn periods.
All new stove installations EPA-certified, Phase II stoves or equivalent	Yes	A.R.S. 9-500.16 and A.R.S. 11-875 (1998) require cities and the County to adopt by December 31, 1998, an ordinance that prohibits the installation or construction of a fireplace or wood stove unless it is a fireplace with a permanently installed gas or electric log insert, a fireplace or wood stove that meets EPA's Phase II wood stove

TABLE RWC-1 ANALYSIS OF BACM AND MSM FOR RESIDENTIAL WOOD COMBUSTION			
SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
			requirements, or a fireplace with a wood stove insert that meets EPA's Phase II stove requirements. Most jurisdiction have adopted or have committed to or indicated that State law requires them to adopt the required ordinance. Funding is provided through annual budget process and enforced through the building permits and code. See MAG Plan, pp, 7-55 to 7-64.
Measures to improve woodburning performance: firewood moisture limit, weatherization of homes, opacity limit	Yes (partial)		Maricopa County's Residential Woodburning Restriction Ordinance prohibits the burning of inappropriate fuel, including wood with a moisture content of greater than 30 percent. Reasons for rejecting weatherization measure are not given. However, MAG has indicated that residential wood combustion in Maricopa County is for ornamental and not heating purposes (Justification for Non-implementation for MAG 1998 Plan). For this reason, a weatherization program would probably not result in decreased wood combustion. We believe that the failure to consider this measures is trivial and does not affect our finding the MAG plan provides for BACM and MSM. During restricted-burn periods, the ordinance prohibits visible emissions to the atmosphere after 20 consecutive minutes immediately following an ignition of or a refueling of an exempt or approved woodburning device.
Inducement to retrofit existing fireplaces and uncertified wood stoves	Yes		A.R.S. 43-1027 allows for a tax deduction of up to \$500 for the conversion of an existing woodburning fireplace to a clean burning wood stove or gas-fired fireplace.
Requirement to retrofit existing fireplaces and uncertified wood stoves	No	Yes	High cost for a very limited potential emission reduction (estimated to be less than 0.49 mtpd). The requirements for new fireplace and wood stove installations and the mandatory curtailment program limit the potential air quality benefits from this measure. Measure would also be difficult to enforce given the number of residences that would need to be inspected for compliance (~300K). Maricopa County commitments, justification for non-implementation for MAG 1998 Plan.
Restriction on the number and density of new wood stoves and/or fireplace installations	No	Yes	Reasons for rejecting this measure are not given. A.R.S. 9-500.16 and A.R.S. 11-875 (1998) require cities and the County to restrict only the type of new woodburning devices. The potential air quality benefit from restricting the number of new woodburning devices would be akin to the benefit from a ban on solid fuel burning devices in new construction (discussed below) and would be very limited. Because the potential reductions are very small and the implementation of this measure would not advance attainment, we believe that the failure to consider this measures is trivial and does not affect our finding the MAG plan

TABLE RWC-1 ANALYSIS OF BACM AND MSM FOR RESIDENTIAL WOOD COMBUSTION			
SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
			provides for BACM and MSM.
Device offset and/or upgrade offset program (tradeable permits for wood stoves)	No	Yes	Reasons for rejecting this measure are not given. The measure requires emissions from new clean stove installations to be offset by the upgrade (retrofit) or elimination of uncertified wood stoves. Because Maricopa's mandatory curtailment program generally prohibits the use of uncertified wood stoves during curtailment periods, this measure would have little air quality benefit. The cost of implementing such an offset program could be very high. Because the potential reductions are very small and the implementation of this measure would not advance attainment, we believe that the failure to consider this measures is trivial and does not affect our finding the MAG plan provides for BACM and MSM.
MOST STRINGENT MEASURES			
Cease use of all woodburning devices (except low-income households with no other source of heat) upon declaration of curtailment period	No	Yes	Maricopa's mandatory curtailment program is a single stage program that allows the use of certain woodburning devices (EPA-certified, Phase II wood stoves or equivalent and pellet stoves) during declared curtailment periods. The Control Officer may also grant sole source of heat (permanent, temporary, or emergency) and inadequate alternate source of heat exemptions for other woodburning devices. The emission reduction potential of a complete ban on residential wood combustion (except for sole source wood heaters) is limited. Maricopa estimated that this measure (which included curtailment of commercial cooking equipment and barbecues) would reduce PM-10 emissions by 0.081 mtpd. Maricopa County commitments, justification for non-implementation for MAG 1998 Plan.
Limit emission rate of new wood stoves and fireplace inserts to 60 percent of EPA Phase II standards	No	Yes	A.R.S. 9-500.16 and A.R.S. 11-875 (1998) require cities and the County to adopt by December 31, 1998, an ordinance that prohibits the installation or construction of a fireplace or wood stove unless it is clean burning. Because of this requirement and the mandatory curtailment program, limiting the emission rates of new stoves would have very limited emission reduction potential. In addition, Maricopa estimates the cost for this measure to be high. Maricopa County commitments, justification for non-implementation for MAG 1998 Plan.
Prohibit the installation of solid fuel burning devices in any new or modified structure	No	Yes	A.R.S. 9-500.16 and A.R.S. 11-875 (1998) require cities and the County to adopt by December 31, 1998, an ordinance that prohibits the installation or construction of a fireplace or wood stove unless it is clean burning. Because of this requirement and the mandatory curtailment program, a complete ban on solid fuel burning devices in new construction would have very limited emission reduction potential. Maricopa County commitments, justification for non-implementation for MAG 1998 Plan.

TABLE RWC-1 ANALYSIS OF BACM AND MSM FOR RESIDENTIAL WOOD COMBUSTION			
SUGGESTED MEASURE	ADOPTED? If No, OK?		DESCRIPTION OF MEASURE (INCLUDING LEGAL AUTHORITY, RESOURCES, AND ENFORCEMENT PROGRAM) OR REASONED JUSTIFICATION FOR REJECTING MEASURE
	No	Yes	
Limit moisture content of firewood to 20 percent	No	Yes	Implementation of this measure is unnecessary because the dry climate of the Maricopa area reduces the moisture content of firewood to less than 20 percent. In addition, the Residential Woodburning Restriction Ordinance limits the moisture content of wood to 30 percent. Maricopa County commitments, justification for non-implementation for MAG 1998 Plan.

Source of measures: MAG Plan, Table 5-2, measures 49-58, and 144, Table 6-1, measures 97-FP-1 to 97-FP-4, Table 10-7, measures 26 a-i.

This section prepared by Frances Wicher and Patricia Bowman.

IMPLEMENTATION OF BACM AND INCLUSION OF MSM FOR SOURCES OF SECONDARY AMMONIUM NITRATE

Requirement: CAA section 189(b)(1)(B): BACM must be applied to significant sources of PM-10.
CAA section 188(e): Criteria 4 for granting an extension request: Plan must include the most stringent measures that are included in the implementation plan of any State or achieved in practice in any State

Proposed Action: Approve

Primary Guidance Documents: BACM: *Addendum*, pp. 42010- 42014
MSM: Section 3 of this TSD

Primary Plan Cites: MAG plan, Chapters 5, 6, 7, 9 (BACM) and 10 (MSM)

What are the statutory and policy requirements?

CAA section 189(b)(1)(B) requires that the serious area PM-10 plan provide for the implementation of BACM within four years of reclassification to serious. For Phoenix, this is June 10, 2000. BACM must be applied to each significant (*i.e.*, non-de minimis) area-wide source category. *Addendum* at 42011.

Under our BACM policy, the plan must identify potential BACM for each significant source categories including their technological feasibility, costs, and energy and environmental impacts, and provide for the implementation of the BACM or provide a reasoned justification for rejecting any potential BACM.

Arizona has applied for an extension of the serious area attainment date. One of the requirements that must be met before we can grant an extension request is the State “demonstrates to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly be implemented in the area.” CAA section 188(e).

Under our proposed policy on most stringent measures, the plan must first identify potential most stringent measures in other implementation plans or used in practice in other States for the significant source category and for each measure determine their technological and economic feasibility for the area as necessary, compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source category, and provide for the adoption of any MSM that is more stringent than existing measures

and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

The MAG plan identifies secondary ammonium nitrate as a significant source of PM-10 in the Phoenix area. MAG plan, Table 9-9

Description of secondary ammonium nitrate source category

Secondary ammonium nitrate is formed by a chemical reaction in the atmosphere between oxides of nitrogen (NO_x) and ammonia (NH₃). Ninety percent of NO_x comes from motor vehicle exhaust (both on and off road) and the major source (99.9 percent) of NH₃ is from animal wastes. 1994 Regional PM-10 Inventory.

Does the plan meet the statutory and policy requirements?

Existing Controls

Arizona has adopted numerous controls for NO_x including its cleaner burning gasoline program and vehicle emissions inspection program. See earlier sections on on-road motor vehicles and nonroad engines.

Nationally, we have also adopted numerous controls on mobile source NO_x emissions. Again, see earlier sections on on-road motor vehicles and nonroad engines.

Suggested Measure List for BACM and MSM Analysis

Two potential BACM were identified for ammonia and nitrate control: reduce emissions of ammonia and nitrates from agricultural operations and require animal waste management plans for farms/ranches with more than 50 animals. The first measure involves tilling in of manure used as fertilizer within 48 hours of application. MAG plan, Table 6-1, measure 97-AG-3. The second measure would focus on reducing ammonia emissions during winter months. MAG plan, Appendix B, Exhibit 5, p. 5-70. For MSM, no measures were found that required animal waste management plans for farms or ranches and no other measures were identified.¹⁰³ See MAG plan, Table 10-7. A large number of measures that could reduce NO_x emissions

¹⁰³ We are not aware of any measures that address air emissions of ammonia from livestock waste. Both the South Coast and San Joaquin Valley serious PM-10 nonattainment areas are still studying emission rates and control techniques for this source and have adopted no controls.

were identified and have been evaluated earlier in this TSD. See sections on on-road motor vehicles and nonroad engines.

We propose to find that the MAG plan evaluates a comprehensive set of potential controls for ammonium nitrate.

New Controls in the MAG Plan and Justifications for Rejecting Potential Controls

Other than the measures already discussed for on-road vehicles and nonroad engines, the MAG plan does not include any measures directly targeting ammonium nitrate.

Data from earlier studies indicate that ammonia emissions would need to be reduced by 80 percent to have an appreciable impact on ambient concentrations of ammonium nitrate. MAG plan, Appendix B, Exhibit 5, p. C-1. Almost all ammonia emissions in the inventory are from cattle feedlots and dairies and not from the application of manure to agricultural fields. As result, controls on manure application are very unlikely to have any impact on PM-10 levels the Phoenix area and therefore are not technologically feasible.¹⁰⁴ The estimated reduction in ammonia from implementing waste management plans is 30 percent, far short of the 80 percent needed to show impact on PM-10 levels (MAG plan, Appendix B, Exhibit 5, p. 5-72), so we also believe that this measure is currently not technologically feasible.

Other than the on-road vehicle and nonroad engine categories, we do not believe that there are any other sources of NO_x that should be called significant in terms of contributing to ammonium nitrate levels. The plan does include an extensive number of measures for these sources. No measures for controlling ammonia were found to be technologically feasible. We, therefore, propose to find that the MAG plan provides for the implementation of RACM and BACM and for inclusion of the MSM for secondary ammonium nitrates.

This section prepared by Frances Wicher.

¹⁰⁴ We consider a measure technologically feasible for an area only if it has the potential to reduce emissions in a way that reduces ambient concentrations in the area.

MCESD'S COMMITMENTS TO IMPROVE COMPLIANCE AND ENFORCEMENT OF THE FUGITIVE DUST PROGRAM

MCESD has committed to an extensive overhaul of the compliance and enforcement program for its fugitive dust sources. The commitments are found in Maricopa County, 1999 Revised Measure 6, adopted December 15, 1999. A narrative description of the commitments and other program changes are found in MAG TSD, Appendix IV, Exhibit 3. MCESD has also committed to continuing to improve Rule 310 and Rule 310.01. These commitments are described in the TSD section "Implementation of BACM and Inclusion of MSM for Construction Activities and Sites." MCESD has recently provided us with an update on the status of these commitments which have discussed below.

These improvements cover rule and test method revisions (discussed previously in the section "Implementation of BACM and Inclusion of MSM for Construction Sites and Activities"), increased public outreach and education, increased funding and staffing, increased inspection frequency, revised enforcement policies, and commitments to program evaluations and improvements. They address many of the program areas that are key to improving compliance and we believe form a solid program for increasing the effectiveness of the County's fugitive dust program.

Staffing

Commitment: By the end of January 2000, the inspection staff will increase to eight inspectors, 1 supervisor, 1 aide and 2 enforcement officers. By April, 2000, the County Attorney's office will hire an attorney to expedite civil litigation and to assist with prosecuting Class One Misdemeanor cases. A coordinator will be added to the Small Business Environmental Assistance Program to assist smaller builders and construction companies and to help develop and implement education programs. In total, resources devoted to the fugitive dust program will be 15 positions, a 25 percent increase over previous levels. These resources are in addition to the Department's enforcement staff. This level of staffing is in contrast to the less than 1 staff position devoted to the program in 1996.

After reaching the committed staffing level, MCESD will review the program in March 2000 to evaluate its effectiveness and the potential need to add more staff.

Status as of September 1, 2001: By the end of January 2000, inspection unit staffing increased to eight inspectors, 1 supervisor, 1 coordinator (to oversee permit issuance and track NOVs), 2 aides and 2 enforcement officer. By May 2000, the County Attorney's office hired an attorney, paralegal, and support staff to expedite civil litigation and to assist with prosecuting Class One Misdemeanor cases. In 2000, the Department found that existing staff in the Small Business Environmental Assistance Program were able to handle the workload for assisting smaller builders and construction companies and for helping to develop and implement education programs. MCESD will re-evaluated the need for an additional coordinator in the small business

assistance program when the second generation outreach and education materials is completed. In total, resources devoted to the fugitive dust program were 17 positions, a 42 percent increase over previous levels. These resources were in addition to the Departments enforcement staff.

MCESD will continue to review the program in March of each year to evaluate its effectiveness and the potential need to add more staff.

Organization

Commitment: A new enforcement section has been created under the direct control supervision of the MCESD Director/Air Pollution Control Officer (APCO). This position streamlines enforcement by reducing the supervisor and senior management review and approval of enforcement and allows enforcement officers to submit directly to the APCO's desk all enforcement actions requiring APCO approval.

Inspectors will be located in two new regional offices to provide quicker response times to dust-related complaints and allow more time in the field.

Status as of September 1, 2001: The new enforcement section was created under the direct supervision the MCESD Director/APCO.

Inspectors are now located in four regional offices to provide quicker response times to dust-related complaints and allow more time in the field.

Funding

Commitment: Revenue for the fugitive dust program is estimated at \$1.12 million from annual earth moving permit fees, a \$772,000 increase over the previous level before permit fee increases were adopted in 1998.

Status as of September 1, 2001: Anticipated revenue for the fugitive dust program is approximately \$1.7 million for FY 2000-2001, generated from annual earth moving permit fees. This is a \$1.35 million increase over the previous level before permit fee increases were adopted in 1998.

Inspection Program

Commitment: MCESD will develop by April, 2000 inspection priorities for vacant lots and unpaved parking lots considering lot size and number of sources with larger lots being inspected first and smaller lots in succeeding years. A number of cities have municipal programs to address these sources; therefore, the Department will initially direct its inspections to cities lacking such programs. It will also track city plans to stabilize target unpaved roads, alleys and unpaved shoulders.

MCESD has also increased inspection rates and improved procedures for permitted sources:

- Pro-actively inspect sites larger than 10 acres, 3 to 6 times per year and inspect smaller sites once within 30 days of project start date.
- Schedule weekend inspections randomly once per month.
- Provide a shortened complaint response time with a goal of 8 hours for high priority complaints and maintaining the current goal of 24 hours for others
- Revise standard operating procedures and checklists for fugitive dust inspections to be consistent with the revised rules.
- Revise inspection standard operating procedures to have inspectors check for records and inspect fugitive dust sources at permitted stationary sources.

Status as of September 1, 2001: MCESD developed by April, 2000 inspection priorities for vacant lots and unpaved parking lots considering lot size and number of sources with larger lots being inspected first and smaller lots in succeeding years. A number of cities have municipal programs to address these sources; therefore, the Department is initially direct its inspections to cities lacking such programs. EPA and MCESD attempted unsuccessfully to convert an Assessor's Office database of vacant lots into a user-friendly format and as a result, MCESD inspectors are assigned geographical districts and are compiling notes on the vacant lots and unpaved parking lots in each district during their routine surveillance activities. Under current MCESD policy, the inspectors are first directed to handle all complaints and then to begin to address the larger sites on the individual district lists. In 2000, the inspectors made 499 inspections on vacant lots, unpaved parking lots, and unpaved roads.

Enforcement Program:

Commitment: By April 2000, MCESD will revise its fugitive dust enforcement policy to

- include guidelines for initiating various enforcement actions
- include guidelines for reinspect
- define timely and appropriate action by laying out guidelines for which type of violation is appropriate for specific enforcement actions and for the time frames for escalating enforcement actions when appropriate
- identify priority violations
- include guidelines for when to seek penalties reflecting the economic benefit of noncompliance, if feasible
- include guidelines for seeking and determining higher penalties for repeat violators

- guidelines for inspectors to handle predetermined citation categories from observation to justice court

Enforcement action options include issuing an Order of Abatement, filing a Misdemeanor Complaint in Justice court, or asking the County Attorney to seek a civil penalty in Superior Court.

Inspectors will handle certain predetermined citation category violations and will be responsible for case development from observance of a violation to filing the actual citation in the justice court. Having the inspectors handle routine case will enable the enforcement officers to work on resolving cases involving more serious and complicated violations.

Status as of September 1, 2001: MCESD issued a revised air quality enforcement policy on April 28, 2000 consistent with its commitment. See Air Quality Violation Reporting and Enforcement Policy and Procedure, MCESD, April 28, 2000.

Public Outreach/Education

Commitment: Public outreach and education consists of staff training, educating the regulated parties and developing good working relationships with other involved parties such as the cities and justice court judges and making the program more understandable. Increased education of both inspectors and the regulated industry increases compliance.

Among the public outreach and education efforts will be

- Inspector training on case development.
- Inspector training on revised test methods.
- City staff training on prepare inspection reports and notices of violation.
- On-going training at the local community college.
- Making information available on MCESD website.
- Distribution of information through city building departments and other sources.

Status as of September 1, 2001: In 2000, MCESD completed a revised dust control guideline with its partners ADOT and ASU. This year ADOT secured a research grant directed towards developing educational tools and outreach programs. This project will enhance the current guidelines, add information on the life cycle costs of controls and controls' impact on the construction process, and develop additional outreach tools. In addition, MCESD is currently working with two contractors to develop a model environmental management system for construction. These two efforts will add to the technical knowledge on dust control and offer additional tools for companies to increase compliance with regulations.

On-going public outreach and education efforts include:

- Inspector training on case development.
- Inspector training on revised test methods.
- Training at the local community college.
- Making information available on MCESD website.
- Distribution of information through city building departments and other sources.

Program Evaluation and Tracking

Commitment: MCESD will track the number of inspections, number and type of enforcement actions, amount of penalties assessed, and amount of penalties collected. It will conduct mid-year review of the program in September, 2000 and again in March 2001 to evaluate progress and future needs.

Status as of September 1, 2001: It will conduct mid-year review of the program in September, 2001 and again in March 2002 to evaluate progress and future needs. MCESD conducted 6625 inspections in 2000. In the first year of operation under the new enforcement process, it issued 189 violations, processed 145 settlement cases and netted \$425,000 in fines (May 1, 2000 to April 30, 2001).

EXTENSION REQUEST – APPLICATION

Requirement: CAA section 188(e) allows states to apply for an extension of up to five years of the serious area attainment date.

Proposed Action: Approve

Primary Guidance Documents: Section 3 of this TSD.

Primary Plan Cites: Chapter 10

What are the statutory and policy requirements?

CAA section 188(e) allows states to apply for an extension of the serious area attainment date of up to 5 years.

The State must apply for an extension of the attainment deadline under section 188(e). The request should be accompanied by the SIP submittal containing the most expeditious alternative attainment date demonstration required by CAA section 189(b)(1)(A)(ii). The state must be provided the public with reasonable notice and a hearing on the request before it is sent to EPA.

How are these requirements addressed in the plan?

MAG, as the lead air quality planning agency for the Phoenix metropolitan area, formally requested an extension of the PM-10 nonattainment deadline to December 31, 2006 based on documentation in the Chapter 10 of MAG plan and Appendix C, Exhibit 5 of the MAG plan. See MAG plan, p. 10-2.

This extension request and the documentation supporting it are integral parts of the MAG plan and was subject to a public hearing along with the rest of the plan. This plan also included the demonstration that the plan provided for the most expeditious attainment date practicable.

Does the plan meet the statutory and policy requirements?

Arizona, through its designated lead air quality planning agency, requested in writing an extension of the attainment date and submitted the request and its supporting documentation only after they were subject to public notice and comment as required by 40 CFR 51.102 and our completeness criteria in 40 CFR part 51, Appendix V.

EXTENSION REQUEST – DEMONSTRATE THE IMPRACTICABILITY OF ATTAINMENT BY DECEMBER 31, 2001

Requirement: CAA section 188(e) allows states to apply for an extension of up to five years of the serious area attainment date but only if they have demonstrated that it is impracticable to attain by December 31, 2001. CAA section 189(b)(1)(A) requires serious area plans to either demonstrate attainment by December 31, 2001 or demonstrate attainment is impracticable by that date.

Proposed Action: Approve

**Primary
Guidance
Documents:** Section 3 of this TSD

**Primary
Plan Cites:** Chapter 10
ADEQ TSD, p. 3-8.

What are the statutory and policy requirements?

CAA section 188(e) allows us to extend the attainment date for a serious PM-10 area beyond December 31, 2001, if a number of conditions are met. The second extension criterion requires the State to demonstrate that attainment by 2001 is impracticable. CAA section 188(e).

CAA section 189(b)(1)(A) requires serious area plans to either demonstrate attainment by December 31, 2001 or demonstrate attainment is impracticable by that date.

In order to demonstrate impracticability, the plan must show that the implementation of BACM on significant (that is, non-de minimis) source categories will not bring the area into attainment by December 31, 2001. BACM is the required level of control for serious areas that must be in place before the 2001 attainment date; therefore, we believe that it is reasonable to interpret the Act to require that a state provide at least for the implementation of BACM on significant source categories before it can claim impracticability of attainment by 2001. This interpretation parallels our interpretation of the impracticability option for moderate PM-10 nonattainment areas in section 189(a)(1)(B). In moderate areas, RACM was required before a moderate area plan could claim impracticability of attainment by 1994, the moderate area attainment date. *General Preamble* at 13544. The *Ober II* court found this approach reasonable. *Ober II* at 1198.

Under our proposed BACM policy, if applying BACM-level controls to one or more of the proposed de minimis source categories would result in attainment by December 31, 2001,

then those categories are not de minimis (i.e., they are significant) and must have BACM applied to them. Therefore, states cannot use the de minimis exemption to BACM to avoid applying controls that would result in attainment by 2001. See section 3 of this TSD.

The statutory provision for demonstrating impracticability requires that the demonstration be based on air quality modeling. See section 189(b)(1)(A). We have established minimum requirements for air quality modeling. See discussion on air quality modeling later in this TSD.

How are these requirements addressed in the plan?

We have earlier in this TSD described the implementation of BACM in the MAG plan.

ADEQ developed the impracticability demonstration for the 24-hour standard. To make this demonstrate, ADEQ evaluated the impact of controls on sources at both the West Chandler and Gilbert sites in 2001. See Tables Imp-1 and Imp-2. The evaluation showed that attainment at both sites is impracticable by 2001.

TABLE IMP-1 IMPRACTICABILITY DEMONSTRATION WEST CHANDLER			
SOURCE	1995 IMPACT MG/M ³	2001	
		CONTROL %	IMPACT MG/M ³
Ag fields	190	0	190
Ag aprons	24	0	24.2
Road construction	73.5	90	7.4
Housing construction	0.1	90	0
Vacant lands	29.3	0	29.3
Paved Roads	0.2	0	0.2
Unpaved Roads	4.1	0	4.1
Total local impact	321.2		255
Background	80		59.6
Total	401.2		314.6

Source: ADEQ TSD, pp. 3-10

TABLE IMP-2 IMPRACTICABILITY DEMONSTRATION GILBERT			
SOURCE	1995 IMPACT MG/M ³	2001	
		CONTROL %	IMPACT MG/M ³
Ag aprons	55	0	55
Vacant lands	13.5	0	13.5
Unpaved parking Lots	67.2	0	67.2
Paved roads	1.5	0	1.5
Unpaved roads	3.5	0	3.5
Total local impact	140.7		140.7
Background	90		64.8
Total	230.7		205.5

Source: ADEQ TSD, pp. 3-11

Does the plan meet the statutory and policy requirements?

Based on our analysis of control measures in the MAG plan as described in the preceding sections, we propose to find that the MAG plan provides for implementation of BACM.

In its impracticability demonstration, ADEQ assumed controls only on the “permitted” sources, that is, only on those sources that receive permits from MCESD. ADEQ assumed that all the “nonpermitted” sources—unpaved roads, vacant lots, and unpaved parking lots—are uncontrolled in 2001. This latter assumption does not reflect the efforts by MCESD to assure the implementation of BACM on these sources and is inconsistent with the assumptions made for these sources in the annual standard impracticability demonstration. In fact, in most instances, the assumptions made on overall control effectiveness are inconsistent between the annual standard impracticability and attainment demonstrations and those demonstrations for the 24-hour standard.

To determine if using consistent assumptions between the annual standard and 24-hour standard demonstrations would show that attainment of the 24-hour standard is in fact practicable by 2001, we recalculated the 2001 impacts at each monitor using the control assumptions from

the annual standard demonstrations and additional control information from the BMP TSD.¹⁰⁵ Tables Imp-3 and Imp-4 show the results of these recalculations. In these recalculations, we assume that the sources at the microscale site are in full compliance with the applicable rule.

Our recalculations show that attainment of the 24-hour standard at the West Chandler site remains impracticable by 2001. The site needs substantial reductions, in excess of 50 percent, in agricultural emissions before the 24-hour standard can be attained. This level of emission reduction from agricultural sources is not expected until 2006.

However, our recalculations show that attainment of the 24-hour standard at the Gilbert site is practicable by 2001. The site's primary source, an unpaved parking lot, is subject to full control under Rule 310.01 by 2001 and controls on this source together with controls on vacant lands, also required by Rule 310.01, result in the site showing attainment by 2001.

In order to show attainment, a plan must show attainment at each location within the nonattainment area. Because the West Chandler site is still unable to show attainment of the 24-hour standard by 2001, the Phoenix nonattainment area as a whole is unable to show attainment by that date and the MAG plan's conclusion that attainment of the 24-hour standard in the Phoenix area is impracticable remains correct. We, therefore, propose to find that attainment of the 24-hour standard is impracticable by December 31, 2001.

¹⁰⁵ The agricultural field at the West Chandler site was a cotton field. We, therefore, used control factors for BMP's applicable to cotton fields.

TABLE IMP-3 REVISED IMPRACTICABILITY DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH ANNUAL STANDARD DEMONSTRATION WEST CHANDLER				
SOURCE	CONTROL	1995 IMPACT MG/M ³	2001	
			CONTROL	IMPACT MG/M ³
Ag fields	BMP rule	190	39.1 ¹	115.6
Ag aprons	BMP rule	24	20 ²	19.2
Road construction	Rule 310	73.5	77 ³	16.9
Housing construction	Rule 310	0.1	77 ³	0
Vacant lands	Rule 310.01	29.3	88.7	3.3
Paved Roads	--	0.2	0	0.2
Unpaved Roads	Rule 310.01	4.1	75	1
Total local impact		321.2		156.2
Background - wind blown		58.2		34.04
Background - nonwind		21.8		21.8
Total		401.2		212

Table Footnotes:

1. Between 1995 and 2001, 20 percent of agricultural land were lost to development; control assumes 23.9 percent control to control windblown dust from a cotton field using multi-year crop, the maximum control available from BMPs for this sources.¹⁰⁶ BMP Quantification TSD, p. B-7.
2. No controls for windblown dust for this category. Control reflects loss of agricultural lands only.
3. Control effectiveness for disturbed areas on construction sites only. There was no construction activity on the modeled exceedance day.
4. See Table Imp-3a.

¹⁰⁶ The 20 percent figure is derived from taking the 6/11 of the 37 percent decline in agricultural lands between 1995 and 2001 used in the BMP TSD. 2001 is 6 years past 1995 and 2006 is 11 years past 1995. Agricultural lands are assumed to decline at a steady yearly rate between 1995 and 2006. BMP TSD, Attachment 4. Therefore, a linear interpolation is appropriate. The annual standard demonstration assumes a 26 percent decline in agricultural lands between 1995 and 2001 and a 41 percent decline between 1995 and 2006. See MAG TSD, Appendix 7, Exhibit 8, Table 3.

Source: 1995 impacts: ADEQ TSD, pp. 3-10 Control efficiencies, see Table MOD-7 of this TSD.

TABLE IMP-3A CONTRIBUTIONS TO WINDBLOWN BACKGROUND WITH REVISED CONTROL FACTORS WEST CHANDLER, 2001			
	AGRICULTURE	CONSTRUCTION	VACANT LOTS
Land use percentage	56%	39%	5%
Wind contribution 9 hrs	32.6 $\mu\text{g}/\text{m}^3$	22.7 $\mu\text{g}/\text{m}^3$	2.9 $\mu\text{g}/\text{m}^3$
Overall control efficiency	31.3% ¹	54.9%	53.1%
PM10 Contribution with controls	22.4 $\mu\text{g}/\text{m}^3$	10.2 $\mu\text{g}/\text{m}^3$	1.4 $\mu\text{g}/\text{m}^3$
total windblown background = 34.0 $\mu\text{g}/\text{m}^3$			

Footnote 1. 39.1 percent control from microscale component with a 80 percent rule effectiveness factor.

Source: Land use percentages and wind contributions - 9 hrs, ADEQ TSD, p. A-8. Overall control efficiencies, see Table MOD-7 of this TSD.

TABLE IMP-4 REVISED IMPRACTICABILITY DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH THE ANNUAL STANDARD DEMONSTRATION GILBERT				
SOURCE	CONTROL MEASURE	1995 IMPACT MG/M ³	2001	
			CONTROL %	IMPACT MG/M ³
Ag aprons	BMP rule	55	20 ¹	44
Unpaved parking lots	Rule 310	67.2	75	16.8
Vacant lands	Rule 310.01	13.5	88.7	1.5
Paved Roads	--	1.5	0	1.5
Unpaved Roads	Rule 310.01	3.5	75	0.9
Total local impact		140.7		64.7
Background - wind blown		68.2		39.72
Background - nonwind		21.8		21.8

TABLE IMP-4 REVISED IMPRACTICABILITY DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH THE ANNUAL STANDARD DEMONSTRATION GILBERT				
SOURCE	CONTROL MEASURE	1995 IMPACT MG/M ³	2001	
			CONTROL %	IMPACT MG/M ³
Total		230.7		108.3

Footnotes: 1. Between 1995 and 2001, 20 percent of agricultural land were lost to development.

2. See Table Imp-4a.

Source: 1995 impacts, ADEQ TSD, p. 3-11. Control efficiencies, see Table MOD-7 of this TSD.

TABLE IMP-4A CONTRIBUTIONS TO WINDBLOWN BACKGROUND GILBERT, 2001			
	AGRICULTURE	CONSTRUCTION	VACANT LOTS
Land use percentage	55%	41%	4%
Wind contribution 9 hrs	37.5 µg/m ³	28.0 µg/m ³	2.7 µg/m ³
Overall control efficiency	31.3% ¹	54.9%	53.1%
PM10 Contribution with controls	25.8 µg/m ³	12.6 µg/m ³	1.3 µg/m ³
total windblown background = 39.7 µg/m ³			

Footnote 1. 39.1 percent control from microscale component with a 80 percent rule effectiveness factor.

Source: Land use percentages and wind contributions - 7 hrs, ADEQ TSD, p. A-7. Overall control efficiencies, see Table MOD-7 of this TSD.

This section prepared by Frances Wicher.

EXTENSION REQUEST – COMPLIED WITH ALL REQUIREMENTS AND COMMITMENTS IN ITS IMPLEMENTATION PLAN

Requirement: CAA section 188(e) allows states to apply for an extension of up to five years of the serious area attainment date but requires in part that they have complied with all requirements and commitments in its implementation Plan.

Proposed Action: Approve

Primary Guidance Documents: Section 3 of this TSD

Primary Plan Cites: Chapter 10
Appendix B, Exhibit 4: MAG Air Quality Plan, 1996 Annual Progress Report.

What are the statutory and policy requirements?

CAA section 188(e) allows the EPA to extend the attainment date for a serious PM-10 area beyond December 31, 2001, if a number of conditions are met. One of these conditions is that the State “has complied with all requirements and commitments pertaining to the area in the implementation Plan[.]”

We interpret this criterion to mean that the State has implemented the control measures in prior SIP revisions it has submitted to address the CAA requirements in sections 172 and 189 for PM-10 nonattainment areas. It does not include measures being approved in this action.

How are these requirements addressed in the plan?

The two principal SIP revisions that Arizona has submitted to address PM-10 are:

- MAG 1991 Particulate Plan for PM-10 for Maricopa County Area,” MAG, November 1991 and the 1993 and 1994 revisions to this plan.
- ADEQ, “Plan for Attainment of the 24-hour PM-10 Standard, Maricopa County PM-10 Nonattainment Area,” May 1997.

These 1991 MAG plan and its 1993 and 1994 revisions include a broad range of measures to address PM-10 including control for construction sites, paved road, unpaved roads, unpaved parking areas, vacant lots, and woodburning. The 1991 plan also included reasonably available control technology for stationary sources and a wide range of transportation control measures. The measures in this plan are described in the MAG plan at pp. 10-10 to 10-25. The principal controls, however, in this plan were Rule 310 and the County woodburning ordinance and rule, although the plan did contain a large number of commitments from local jurisdictions to implement various measures. Most of the measures represented “business as usual” actions by the jurisdictions to do infrastructure (e.g., road) improvements, to implement existing building codes or take actions already underway for the carbon monoxide plan.

The 1997 Microscale plan focused on fugitive dust sources such as construction sites, vacant lots, unpaved roads, unpaved parking lots, and agriculture. The principal controls in this plan were improvements to the implementation of Rule 310 and coordination with the cities to improve fugitive dust control. Implementation of these measures are discussed in Maricopa County commitment Improvement Measures 1 and 2.

Does the plan meet the statutory and policy requirements?

We propose to find that the State has complied with the requirements and commitments in its implementation plan. We note that only Rule 310 and a few local jurisdiction measures were relied on for explicit numerical emissions credits in the 1991 MAG plan and based on information available to us, these measures have been implemented. See Revised Chapter 9 of the 1991 MAG plan.

Other Information

1997 Microscale Plan Disapproval

Our proposed finding that the requirements and commitments in the 1991 MAG plan and its revisions have been implemented may seem to conflict with our finding on the Microscale plan that Arizona had not provided for the implementation of BACM on non-permitted sources subject to Rule 310 (e.g., disturbed vacant land).¹⁰⁷ However, it does not.

In the 1991 MAG plan, MCESD committed to implement Rule 310 for non-permitted sources through a complaint-based compliance system. It did in fact implement the rule consistent with this commitment. Subsequently, the technical analysis performed for the Microscale plan showed that a complaint-based compliance program for non-permitted sources was not adequate for attainment and a proactive compliance program was needed. Because the

¹⁰⁷ We refer here to the old Rule 310 adopted in 1994 and not the newly revised Rule 310 adopted in February, 2000.

Microscale plan did not provide for proactive compliance program for non-permitted sources, we found that the plan did not provide for implementation of BACM for these sources. In short, we found that the commitment in the 1991 plan was inadequate and not that MCESD had failed to fulfill its commitment.

The Remote Sensing Program in the Arizona Vehicle Emissions Inspection Program

At the time the MAG plan was first submitted in June 1999, Arizona's vehicle emissions inspection program (VEIP) included a remote sensing program. The remote sensing program consisted roadside monitors that could detect concentrations of carbon monoxide and volatile organic compounds in the tailpipe emissions of cars driving by them. The owners of a vehicle whose tailpipe emissions exceeded certain levels were sent a notice and required to obtain a vehicle emission inspection within a certain period of time. MAG plan, p. 7-179.

In 2000, the Arizona legislature converted the program from a regulatory program to a pilot program because of its high cost per ton of emission reduced. 2001 I/M SIP submittal, p. 26. In July 2001, Arizona submitted SIP revision that included all changes to VEIP program that had be made since it was approved in 1995. This SIP revision included the changes to the RSD program. 2001 I/M SIP submittal, p. 26. We consider this submittal to be Arizona's current statement of what elements constitute its I/M program and supercedes any previous SIP submittals containing elements of that program including any elements that were included in the 1999 MAG plan.

The pre-2000 RSD program was not included in any previous PM-10 plan submittal for the Phoenix area. Consequently, the legislative changes made to the program in 2000 do not affect our proposed finding that the State has complied with the requirements and commitments in its implementation plan.

This section prepared by Frances Wicher.

EXTENSION REQUEST – DEMONSTRATE THE ADOPTION OF THE MOST STRINGENT MEASURES

Requirement: CAA section 188(e) allows states to apply for an extension of up to five years of the serious area attainment date but requires in part that they have included in the plan the most stringent measures found in other SIPs or used in practice.

Proposed Action: Approve

**Primary
Guidance
Documents:** Section 3 of this TSD

**Primary
Plan Cites:** Chapter 10
“Most Stringent PM-10 Control Measure Analysis,” Sierra Research, May 13, 1998 found in Appendix C, Exhibit 4. “MSM Study”

What are the statutory and policy requirements?

The fourth extension criterion requires the State to “demonstrate to the satisfaction of the Administrator that the plan for the area includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can feasibly be implemented in the area.” CAA section 188(e).

We discuss our proposed MSM policy in detail in section 4 of this TSD. We have summarized it here.

We propose to define a “most stringent measure” as the maximum degree of emission reduction that has been required or achieved from a source or source category in other SIPs or in practice in other states and can be feasibly implemented in the area. The Act does not specify an implementation deadline for MSM and we propose that the implementation of MSM should be as expeditiously as practicable.

We believe that the analysis of MSM should follow a process similar to determining BACM but with one additional step:

1. develop a detailed emissions inventory of PM-10 sources and source categories,

2. model to evaluate the impact on PM-10 concentrations over the standards of the various source categories to determine which are significant for the purposes of adopting MSM,
3. identify potential most stringent measures in other implementation plans or used in practice in other states for each significant source category and for each measure determine their technological and economic feasibility for the area as necessary,
4. compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source category, and
5. provide for the adoption of any MSM that is more stringent than existing measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

How are these requirements addressed in the plan?

Steps 1 & 2 : develop a detailed emissions inventory of PM-10 sources and source categories/ model to evaluate the impact on PM-10 concentrations over the standards of the various source categories to determine which are significant for the purposes of adopting MSM.

The MAG plan excluded no source categories of directly-emitted PM-10 from its MSM analysis but instead simply started its evaluation of MSM by identifying candidate measures for any source category of PM-10 present in the Phoenix area.¹⁰⁸ MAG plan, p 10-25.

Step 3: identify potential most stringent measures in other implementation plans or used in practice in other states for each significant source category and for each measure determine their technological and economic feasibility for the area as necessary,

To identify candidate MSM, MAG's contractor Sierra Research interviewed people knowledgeable about PM-10 controls, reviewed the documents used to develop the candidate list of BACM and obtained copies of current air quality control measures from most other States including both SIP and non-SIP measures. MSM Study, p. 1-2.

Evaluation of the feasibility of potential MSM for the Phoenix area was done only for those measures that passed Step 4 below. MSM Study, p. 3-5.

Step 4: compare potential most stringent measures for each significant source category against the measures, if any, already adopted for that source category.

¹⁰⁸ Controls on NO_x sources, a PM-10 precursor, were excluded. MSM study, p. 3-3.

After a comprehensive list of candidate MSM was developed, each measure was screened against the corresponding Maricopa measure to identify those with:

- numerical emission limits more restrictive than those in existing Maricopa measures
- a more extensive list of affected sources than that of the Maricopa measure (e.g., lower applicability threshold)
- fewer exemptions than the Maricopa measure
- one or more substantive regulatory provisions not found in the Maricopa measures

The next round of screening compared similar non-Maricopa rules against each other to determine which measure was the most stringent among all candidate measures from other areas.

The final round of screening then ranked for each source category the surviving measures by emission reduction effectiveness estimate for the Maricopa area.¹⁰⁹ MSM study, p. 3-5.

Step 5. provide for the adoption of any MSM that is more stringent than existing measures and provide for implementation as expeditiously as practicable or, in lieu of providing for adoption, provide a reasoned justification for rejecting the potential MSM, i.e., why such measures cannot be feasibly implemented in the area.

The remaining MSM were grouped by source category and were either included in the plan or a justification for rejecting the measure was provided. MSM study, Table 3-1 and MAG plan, p. 10-46.

Does the plan meet the statutory and policy requirements?

We propose to find the MAG plan demonstrates to our satisfaction that it includes the most stringent measures that are included in the implementation plan of any State, or are achieved in practice in any State, and can be feasibly implemented in the Phoenix area as required in CAA section 188(e) for areas being granted an extension of the attainment date.

We have discussed identification and adoption of MSM and the rejection of any MSM for each category deemed significant for BACM in the sections on “Implementation of BACM and Inclusion of MSM” earlier in this TSD. Below, we discuss the adoption or reasoned justifications for the three potential MSMs identified for categories considered de minimis in the BACM analysis.

¹⁰⁹ For consistency, the source categories used in the MSM analysis are the same ones used in the BACM analysis including both the categories found significant and those found insignificant in the BACM analysis.

As we noted in the section “BACM Analysis, Step 2 Identification of Significant Source Categories,” the proposed de minimis source categories generally fall into one of two types: those that are already subject to control and those that are uncontrollable either by their nature or because the State is pre-empted from controlling them. See Table DEM-3 in the section “BACM Analysis—Step 2, Model to Identify Significant Sources.” Only a few of the categories are controllable but are not currently controlled and all but one of these are the categories for which MSM have been included in the plan.¹¹⁰ We emphasize that these three measures are in addition to the MSM adopted for the source categories considered significant for the BACM analysis.

Cattle Feedlots

Cattle feedlots (including livestock areas, dairies, horse farms, horse stables and other similar sources) are estimated to contribute 0.4 mtpd in 1994 inventory or 0.3 percent of the non-windblown emissions inventory. 1994 Regional PM-10 inventory, Table 2-3. The MAG plan identifies this source category as de minimis with respect to the PM-10 standards. In the microscale analysis, they are not an explicitly identified source category that contributes to 24-hour PM-10 exceedances.

MCESD Rule 310.01 requires that owners/operators of commercial feedlots and/or livestock areas to apply dust suppressants, apply gravel, or install shrubs and/or trees within 50 to 100 feet of animal pens. Commercial feedlots and livestock areas are defined as any operation directly related to feeding animals, displaying animals, racing animals, exercising animals, and/or for any other such activity, for the primary purpose of making a livelihood. The rule requires that controls be implemented in compliance with a 20 percent opacity standard.

For its MSM comparison, the MAG plan identifies South Coast Rule 1186 requirements for livestock operations. MSM analysis, pg. C-18, 19. Rule 1186 defines livestock operation as any operation directly related to the raising of more than 50 animals for the primary purpose of making a profit or for a livelihood. The rule requires any owner/operator of a livestock operation to cease all hay grinding activities between 2 and 5 p.m. if visible emissions extend more than 50 feet from a hay grinding source. The rule also requires that any owner/operator of a livestock operation to treat all unpaved access connections and unpaved feed lane access areas with either pavement, gravel (maintained to a depth of four inches) or asphaltic road base.

The MSM study argues that the South Coast rule imposes similar requirements on cattle feedlots as Rule 310.01. However, we do not agree with this conclusion because it is based on

¹¹⁰ The exception is airport ground support equipment (GSE). Because this source category contributes only 0.8 mtpd (out of an inventory of 130 mtpd) and the equipment is used in just a few locations in the nonattainment area, we do not believe that controls on GSE would contribute to expeditious attainment in the Phoenix area and therefore, the lack of controls on them does not affect our finding that the MAG plan includes MSM to our satisfaction.

the premise that Rule 310.01 applies to unpaved roads located at livestock operations which is inaccurate. Also, the MSM comparison does not specifically state why Rule 310.01 requirements are equivalent to Rule 1186's requirement that livestock operations cease all hay grinding activities between 2 and 5 p.m. if visible emissions extend more than 50 feet from a hay grinding source.

Therefore, we have independently reviewed South Coast Rule 1186 requirements and Rule 310.01 requirements for cattle feedlots, collecting available information on sources to which the rules apply.

South Coast does not have any cattle livestock farms, so their requirements apply primarily to dairies. There are 250 dairies subject to Rule 1186, with the number of cows totaling approximately 300,000 head. (Similar to Maricopa County, this source category is also de minimis in the South Coast with respect to the PM-10 standards.) Rule 1186 does not address fugitive dust emissions from cow activity on the land, but instead controls dust from unpaved roads and hay grinding. Rule 310.01 does address fugitive dust emissions from cow activity on the land, but does not control fugitive dust emissions from roads and hay grinding. The unpaved roads associated with these farms are typically low traffic (e.g. 10-20 ADT). Phone conversation, Karen Irwin, EPA, with Julia Lester, South Coast AQMD, March 21, 2000.

In 1997, there were approximately 115 dairies in Maricopa County, with approximately 107,000 head.¹¹¹ Since then, the number of dairy farms has decreased to 80 and many of these are located outside of the PM-10 nonattainment area.¹¹² Similar to South Coast's dairy farms, MCESD indicates that vehicle trips on dairy farm unpaved roads in Maricopa County are low use. See footnote 112. However, unlike South Coast Rule 1186, Rule 310.01 requirements are focused on controlling fugitive dust emissions from disturbed open areas as opposed to unpaved roads or hay grinding activities at dairies. In Maricopa County, dairy cows are typically fed alfalfa hay. Hay grinding activities occur primarily at feedmills, which are permitted sources and thus already subject to other requirements. See footnote 112.

Because the strategy chosen by MCESD differs significantly from that of South Coast, we find that the two regulations cannot be adequately compared to each other with respect to stringency for dairy farm controls. By default, we do not deem either regulation more stringent than the other, given that they both control distinct aspects of dairy farm operations.

¹¹¹ 1997 USDA Census of Agriculture - County Data, Table 14 "Cattle and Calves".

¹¹² Information regarding cattle feedlots in Maricopa County was relayed in three separate phone conversations between Jo Crumbaker, MCESD, and Karen Irwin, EPA, on February 25, March 23, and March 28, 2000.

South Coast Rule 1186 may also be construed to apply to horse farms. In Maricopa County, there are several horse farms but they do not typically contain large numbers of horses. See footnote 112. This premise is supported by County-wide statistics on horse farms. In 1997, there were 671 horse farms in Maricopa County, with a total of 7,089 horses.¹¹³ The average number of horses per farm, based on these statistics, is approximately 10.5. This suggests that most horse farms in Maricopa County are well below the 50 animal threshold to which South Coast Rule 1186 applies. Also, since we only have County-wide statistics, it is likely that there are many fewer horse farms actually located within the Phoenix PM-10 nonattainment area. For these reasons, we believe it is unnecessary for MCESD to adopt the same requirements as South Coast for these sources to meet MSM.

We have also identified Imperial County Rule 420 requirements for livestock feed yards as an another potential MSM. The PM-10 emissions inventory relied upon at the time the rule was adopted by the Imperial County Air Pollution Control District (APCD) indicated that livestock yards contributed the greatest percentage of PM-10 among all source categories (approximately 38 percent). The rule requires that livestock feed yards develop and submit to the Imperial County APCD a dust control plan. The dust control plan must contain procedures for assuring manure at all times is maintained at a moisture factor between 20 percent and 40 percent in the top three inches in occupied pens. The dust control plan is also to contain an outline of manure management practices.

MCESD has indicated that there is only one feedlot located in the Maricopa County PM-10 nonattainment area.¹¹⁴ This source category contributes a trivial amount to the PM-10 emissions in the area. Therefore, we believe it is unnecessary for MCESD to adopt the same requirements as Imperial County for these sources to meet MSM.

Incinerators (part of the fuel combustion source category)

The MAG plan identifies Clark County's Rule 26 as having a more stringent opacity limit than MCESD's Rule 313. Clark County limits opacity from existing incinerators to 5 percent while Maricopa's limit is 20 percent. MAG plan, Table 10-7.

Incinerators are a very small source in the Phoenix nonattainment area. In 1994 there were 32 incinerators that together emitted 2.56 metric tons per year (7.1 kg per day).¹¹⁵ 1994

¹¹³ 1997 USDA Census of Agriculture - County Data, Table 18 "Horses and Ponies".

¹¹⁴ Op. Cit., Jo Crumbaker, March 30, 2000. Information from Bes Aja of the Arizona Cattlemans Association.

¹¹⁵ These amounts are 0.005 percent of the total daily inventory and 0.005 percent of the annual inventory.

Regional PM-10 Inventory, p. 4-17. Since 1994, the medical waste incinerators in this category have shut down and today there are even fewer emissions. See email, Jo Crumbaker, MCESD to Frances Wicher, March 22, 2000.

Because incinerators are so small a source and controls on them would not advance the attainment date, we propose to find that the MAG plan can provide for the inclusion of MSM to our satisfaction without including Clark County's opacity limit for incinerators.

Charbroiling

Emissions from charbroiling and frying meat are estimated to 0.6 mtpd or 227 mtpy. 1994 Regional PM-10 Inventory, p. 4-25. This is 0.4 percent of the daily directly-emitted PM-10 inventory in 1994 and 0.4 percent of the annual inventory in 1994.

MCESD has committed to develop a new rule requiring existing and new chain-driven and underfired charbroilers, typically found in restaurants specializing in grilled meat products, to be equipped with emission control equipment. South Coast is developing a new rule to deal with underfired charbroilers and MCESD will wait until South Coast completes its rulemaking to adopt this measure. MCESD initially projected adoption of its rule in Spring, 2001. Maricopa County commitments, Revised Measure 23. However, South Coast has delayed adoption of its rule until late 2001, also delaying MCESD's adoption.

We propose to find that implementation of this rule is expeditious. Waiting on South Coast to complete its rulemaking, which will establish control requirements for underfired charbroilers, is appropriate given that the South Coast rule when adopted will set MSM for controls on charbroilers.

This section prepared by Karen Irwin and Frances Wicher.

EXTENSION REQUEST – DEMONSTRATE ATTAINMENT BY THE MOST EXPEDITIOUS ALTERNATIVE DATE PRACTICABLE AFTER DECEMBER 31, 2001

Requirement: CAA section 188(e) allows states to apply for an extension. At the time of application the state must submit a SIP revision that demonstrates attainment by the most expeditious alternative date practicable. CAA section 189(b)(1)(A)(ii) requires serious area plans that demonstrate the impracticability of attainment by December 31, 2001 to demonstrate attainment by the most expeditious alternative date practicable.

Proposed Action: Approve

Primary Guidance Documents: EPA modeling guidance documents (cited below)

Primary Plan Cites: MAG plan, Chapters 7, 8 and 10
Microscale plan
MAG TSD
ADEQ TSD
BMP TSD

What are the statutory and policy requirements for attainment demonstrations?

CAA section 189(b)(1)(A)(ii) requires serious area plans that demonstrate the impracticability of attainment by December 31, 2001 to demonstrate attainment by the most expeditious alternative date practicable. This demonstration must be based on air quality modeling. CAA section 188(e) allows the EPA to extend the attainment date for a serious PM-10 area beyond December 31, 2001, if the state applies for it and certain other conditions are met. However, section 188(e) requires that at the time of application, the state submit a SIP revision that demonstrates attainment by the most expeditious alternative date practicable.

There are two parts to reviewing a modeled attainment demonstration: 1) evaluating the technical adequacy of the modeling itself, and 2) evaluating the control measures that are relied on to demonstrate attainment. We will treat each part separately.

How are these requirements addressed in the plan?

See discussion below.

Does the plan meet the statutory and policy requirements?

For the reasons discussed below, we propose to find that the MAG plan demonstrates attainment of the 24-hour PM-10 standard by the earliest date practicable after December 31, 2001 as required by section 189(b)(1)(A)(ii) of the CAA.

We also propose to find that the attainment demonstration is based on acceptable modeling and relies on control measures that either are approved or have been proposed for approval and meet our SIP enforceability criteria; that the emissions estimates assigned these measures in the attainment demonstration are reasonable; and the measures are being implemented on a schedule that is as expeditious as practicable and will result in attainment of the 24-hour PM-10 standard by the earliest practicable date. See discussion below.

Air Quality Modeling

1. Introduction - How the plan submittals fit together
2. Modeling requirements
3. Overall modeling approach -- conceptual evaluation
4. Microscale analysis (ISC)
5. Supplemental microscale analysis for Gilbert and West Chandler
6. Regional analysis (UAM-LC)
7. Agricultural measures; land use issue
8. Conclusion

1. Introduction - How the submittals fit together

Since we have already proposed approval the MAG plan's provisions for the annual PM-10 standard, our current proposed action concerns only the 24-hour PM-10 standard. However, the treatment of the two standards is somewhat intertwined in Maricopa County serious area PM-10 plan. Over a four year period, Arizona has made three submittals that contain elements of the attainment demonstrations for the two PM-10 standards: the 1997 Microscale plan, the 2000 revised MAG plan, and the 2001 BMP TSD. A more complete description of these submittals can be found in section 1 of this TSD. This introductory section describes how these fit together to create the overall attainment demonstration for each standard.

The attainment demonstration for the 24-hour standard is divided into two parts, a microscale analysis and a regional analysis. Portions of a microscale or localized analysis are in all three submittals: an initial description of approach and attainment demonstration for two monitoring sites in the microscale plan, an assessment of reductions need for attainment at two agriculture-affected sites in the MAG plan, and finally the analysis of the agricultural measures in the BMP TSD. The regional analysis is contained in the MAG plan covers both the 24-hour and annual PM-10 standards.

The first of the three submittals, the 1997 Microscale plan, contains a microscale, or localized, inventory and ISCST modeling analysis of 24-hour standard exceedances at four

monitoring sites in the Phoenix area: Maryvale, Salt River, West Chandler and Gilbert. It shows attainment of the standard at the Maryvale and Salt River sites but does not demonstrate attainment for the Gilbert and West Chandler sites, both of which had substantial emissions from agricultural sources.

The second submittal, the 2000 revised MAG plan contains a regional modeling analysis of both the 24-hour and annual exceedances using the UAM-LC model and also uses the ISCST model to determine that a 58 percent reduction in agricultural emissions is needed to attain the 24-hour standard at the Gilbert and West Chandler sites. However, at the time of its submittal, Arizona had not yet completed adoption of its BMP rule and also had not yet quantified the expected reductions from rule and was unable demonstrate attainment at these sites.

Because the Microscale plan and MAG plan do not by themselves demonstrate attainment of the 24-hour PM-10 standard, the State made a third, supplemental submittal in 2001, the BMP TSD which documents the expected emission reductions from the BMP rule. While it does not contain new modeling, it does show that the BMP rule's emission reductions, together with a reasonable estimate of land use change, provide more than the 58 percent needed for attainment at the Gilbert and West Chandler sites.

In summary, the three submittals that make up the attainment demonstration for the 24-hour standard in the Phoenix area are:

1. 1997 Microscale plan

- localized analysis of 24-hour PM-10 using ISCST model
- shows 24-hour attainment for Maryvale and Salt River microscale sites
- shows available measures insufficient for Gilbert and West Chandler

2. 2000 Revised MAG plan

- regional analysis of 24-hour and annual PM-10 using UAM-LC model
- shows 24-hour and annual attainment for whole area
- estimates reductions needed for Gilbert and West Chandler sites using ISCST (this is addressed in the "ADEQ TSD", Appendix C, Exhibit 3 in the MAG plan)

3. 2001 BMP TSD

- shows the BMP rule emission reductions suffice for attainment at Gilbert and West Chandler

None of these submittals provides an explanation of how they work together as a complete attainment demonstration for both PM-10 standards. Rearranging the above descriptions according to how they address the two standards, one finds that the annual PM-10 standard is addressed the only in the second submittal, the MAG plan, which contains a regional analysis, covering all locations at once using the UAM-LC model. The 24-hour Standard is addressed the in all three submittals. As with the annual standard, the plan addresses the

24-hour PM-10 standard using a regional analysis in the MAG plan. The plan also addresses the 24-hour standard in each of the three submittals via a localized or microscale analysis using the ISCST model. Analyses for the Maryvale and Salt River microscale sites is completely contained in the first. The analysis for the Gilbert and West Chandler sites is spread among the three, respectively showing that 1) available measures are insufficient for attainment, 2) 58 percent control on agricultural sources would be sufficient, 3) the agricultural BMPs, together with a reasonable estimate of land use change, provide more than the 58 percent needed for attainment.

TABLE MOD-1 ATTAINMENT DEMONSTRATIONS IN THE MAG PLAN			
PM-10 STANDARD	MICROSCALE PLAN	MAG PLAN	BMP TSD
Annual	—	evaluated, attainment demonstrated, approval proposed	—
24-hour regional	—	evaluated & attainment demonstrated, evaluated in this TSD	—
24-hour Maryvale	evaluated, attainment demonstrated, and approved	—	—
24-hour Salt River	evaluated, attainment demonstrated, and approved	—	—
24-hour Gilbert	evaluated & attainment not demonstrated	evaluated & reductions needed for attainment calculated, evaluated in this TSD	showed reductions from measures (including BMP rule) sufficient for attainment, evaluated in this TSD
24-hour West Chandler	evaluated & attainment not demonstrated	evaluated & reductions needed for attainment calculated, evaluated in this TSD	showed reductions from measures (including BMP rule) sufficient for attainment, evaluated in this TSD

2. Modeling requirements and guidance

General. The basic attainment demonstration requirement is that the states show that enforceable control measures will be sufficient to reduce ambient 24-hour average PM-10 concentrations to under $150 \mu\text{g}/\text{m}^3$ by the end of 2001, or if attainment is impracticable by that date, as expeditiously as practicable but no later than the end of 2006 (CAA section 189(b)(1)(A)). We have issued several guidance documents and memoranda that prescribe PM-10 modeling procedures. However, this available guidance is not comprehensive and is sometimes aimed only at moderate, rather than serious, PM-10 plans. Interpretation and judgement is therefore needed in applying the guidance; also, the guidance explicitly recognizes that case-by-case evaluations of SIP modeling may be needed at times.

The attainment demonstration must be based on some form of air quality modeling. CAA section 189(a)(1)(B). The *PM-10 SIP Development Guideline* (EPA-450/2-86-001, June 1987, "PSDG") specified that, in order of preference, the modeling used in the demonstration can be 1) a combination of receptor and dispersion models, 2) dispersion models alone, or 3) two receptor models alone if dispersion modeling is inappropriate. For completeness (40 CFR 51 Appendix V, 2.2(e)), the SIP should include input and output data, including meteorological data, justification for the models used, for any off-site data used, and assumptions and settings used in the models.

Appropriate model use, such as the modeling of projections with allowable emissions rather than actual and the preparation of meteorological inputs, is described in the *Guideline On Air Quality Models (Revised)*, 1986 ("GAQM"), and in the user guides for particular models. GAQM 7.2.2 calls for the use of ISC2 ("Industrial Source Complex" model, ISCST2 or ISCLT2) for source-specific analyses of complicated sources of PM-10, and urges that receptor models be used in conjunction with dispersion models. GAQM 7.2.2 also states that a case-by-case approach is needed, for example if area sources are predominant (which is the case in the Maricopa area). The *Protocol for Applying and Validating the CMB Model* (EPA-45/4-87-020, May 1987) should generally be followed when the Chemical Mass Balance (CMB) model is used. Performance of models used should be evaluated in the SIP. If both receptor and dispersion modeling techniques are used, as preferred, the results should be reconciled using the *Protocol for Reconciling Differences Among Receptor and Dispersion Models* (EPA-450/4-87-008, March 1987).

Generally receptor models, such as the Chemical Mass Balance Model (CMB), cannot distinguish between the many source categories that create fugitive dust, like roadway dust, vacant lots, construction activities, etc. Thus for fugitive dust-dominated areas, the default recommendations for model selection, receptor and dispersion modeling combined, are not adequate. Previous work, as well as work done for the current plan (e.g., inventory summary in MAG plan modeling TSD, Table II-1, page II-9), has shown that the predominant portion of PM-10 in the Phoenix area is fugitive dust. Because of this, we did not recommend that MAG pursue receptor modeling.

When an EPA-approved model such as ISCST or UAM is used in permitting of point sources, normally no model validation is required; it is assumed that the testing procedures by which the model became approved suffice. However, for a SIP it is desirable to evaluate the model results to ensure that the area's exceedances are being reasonably replicated. This is especially true when the emissions input to the model are uncertain, such as when fugitive dust is a major component. A formal study in accordance with EPA guidance on model acceptability is not necessary, but there should be some evaluation of the model's performance, with consideration given to the interaction of meteorological inputs and the emissions from contributing pollution sources.

Area-wide (regional) modeling. For reasons discussed in the next section, Arizona used both regional scale and local scale analyses in developing the 24-hour PM-10 attainment demonstration. Somewhat different guidance applies to these two approaches. There is little guidance for regional or area-wide PM-10 modeling — as opposed to receptor and source-specific modeling — for PM-10. *GAQM 7.2* states that RAM or CDM 2.0 should be used for urban-wide analyses. These two models are now outdated; the current dispersion model is ISCST3 (ISCST2 at the time the plan was prepared); it has all the capabilities of RAM and CDM. For carbon monoxide, for which RAM was formerly the recommended model, we now recommend the use of UAM ("Urban Airshed Model"). Since primary PM-10 is also an inert pollutant, and we also originally recommended RAM, a parallel with carbon monoxide makes it plausible to use UAM for PM-10.

There is no recommended model for analyzing secondary particulates (which form chemically in the air from precursors like ammonia and oxides of sulfur and nitrogen); a case-by-case approach (including possibly rollback) may be used (*GAQM 7.2*).

We do have extensive guidance on area-wide modeling of ozone and carbon monoxide. We have therefore used the existing guidance for these pollutants modeling in evaluating the plan's area-wide modeling (*Guideline for Regulatory Application of the Urban Airshed Model*, EPA-450/4-91-013, July 1991; *Guideline for Regulatory Application of the Urban Airshed Model for Areawide Carbon Monoxide*, EPA-450/4-92-011a and b, July 1992). It should be kept in mind that, strictly speaking, the ozone and CO modeling guidance is not binding on PM-10 SIP modeling. Thus, we have flexibility in using the criticisms and concerns raised below in determining acceptability of the submittal's modeling, e.g. in emission and other input preparation and in model performance.

Localized (microscale) modeling. Our guidance on attainment demonstrations generally assumes that the entire nonattainment area will be modeled using a dispersion model. However, emissions inventory development and modeling for areas with substantial fugitive dust problems, such as the Maricopa area, has proved difficult, because fugitive dust emissions' marked uncertainty and their temporal and spatial variability. Accurately estimating emissions for input to dispersion modeling of fugitive dust over a large area is much more difficult than for point

sources of gaseous pollutants, which were the archetypes for development of much of the modeling guidance.

Partly because of this emissions inventory uncertainty, initial EPA PM-10 guidance (*Receptor Model Technical Series, Volume I, Overview of Receptor Model Application to Particulate Source Apportionment*, EPA-450-4-81-016a, July 1981 p. 27; *PM-10 SIP Development Guideline*, section 6.4.2) put forward alternatives such as Chemical Mass Balance and the microinventory method, which focus on analysis of concentrations at specific monitoring sites. Even for these alternatives, the sites analyzed were to be shown to be "controlling", i.e., the resulting emission reduction targets were to be shown sufficient for attainment throughout the nonattainment area. The guidance does not describe how to make this showing, but some justification should be provided on how the sites chosen are "worst case" in the sense of resulting in the most stringent control requirement, or at least representative of exceedances.

The idea of intensively inventorying and modeling a small area is a reasonable one for assessing pollutants like PM-10, which is emitted near ground level and has relatively sharp spatial gradients as dust settles out with distance from the source, and hence has more localized effects than the other criteria pollutants, which are typically buoyant and gaseous. A focus on nearby source types and their activity levels is especially appropriate for fugitive PM-10 emissions, with their dependence on local soil characteristics and micrometeorology.

3. Conceptual evaluation of SIP submittal's overall modeling approach -- microscale and regional

Microscale analysis. The default assumption for an attainment demonstration is one that covers every point within the nonattainment area; the plan submittal's microscale approach focuses its analysis on small areas within the overall nonattainment area. This section of the TSD provides justification for the conceptual basis of the microscale approach. Note that the submittal does contain a regional analysis as well; these two independent analyses make for a stronger modeling demonstration.

The division between "microscale" and "regional" analyses reflects the result of a series of discussions between us, ADEQ, MCESD, and MAG regarding how the serious area plan's attainment demonstration could best address the area's PM-10 standard exceedances. The microscale approach is more fully described in *Microscale Monitoring and Modeling Protocol for the Maricopa PM-10 Nonattainment Area* by Harding Lawson Associates, 8/31/94 ("protocol"), and some of the following discussion also appears in our comment letters (10/17/94, 10/31/94) on the microscale protocol.

PM-10 from fugitive dust tends to be a localized pollutant because of its rapid deposition. As a result, ambient concentrations of PM-10 due to a fugitive dust source fall off with distance from the source much more rapidly than the ambient concentrations due to gaseous pollutants like CO, which have a longer atmospheric life-span. This is especially true for ground-level

sources such as the fugitive dust that is the main PM-10 emission source in the Maricopa area. This observation has been borne out in earlier ADEQ work as well as in the Microscale plan itself. An intensive emissions inventory and modeling analysis of the area in the immediate vicinity of monitors exceeding the standard — a "microscale" analysis — is thus a reasonable approach for an attainment demonstration. (Note: The term "microscale" is used in EPA monitoring regulations — a 40 CFR part 58, Appendix E, and elsewhere — to mean a scale of several to one hundred meters. In the Maricopa microscale plan, its meaning is in opposition to "regional".)

The submittal's approach is an extension of the microinventory method recommended in early EPA guidance (cited above), under which intensive inventory work was done for areas near monitors exceeding the standard, to be used in a rollback attainment demonstration (concentration assumed directly proportional to emissions). The MAG plan's microscale approach goes further in that it uses dispersion modeling in conjunction with the inventory. It thus gives a better indication of the relative impact of sources at the monitor, instead of just assuming that emissions from sources contribute to monitored concentrations independent of distance and meteorological conditions. It also allows an assessment of their effects at locations other than the monitor.

Under the microscale approach, the areas around the exceeding monitors are deemed to be representative of locations throughout the nonattainment area. Attainment is demonstrated at locations representing the mixes of emission sources that occur in the area. (This is somewhat analogous to ambient monitoring: a monitoring network that reliably assesses the attainment status of an area is composed of monitors at representative locations.) Although a given emitting activity, such as new housing construction, will eventually decline in a given location, it will reappear elsewhere as the metropolitan area grows. A location that is currently experiencing a lot of construction can thus be used to represent locations where construction will occur in the future. Strengthening the argument for the adequacy of the microscale approach is the fact that all locations exceeding the 24-hour PM-10 standard were subjected to such an analysis: a demonstration of attainment at these locations will show that the mixes of sources that in practice cause exceedances will be controlled sufficiently to meet the standard.

The approach is not a monitor-only attainment demonstration since these sites contain a mix of sources that represent other locations in the area, and the controls are applied over the entire nonattainment area. Further, the controls persist in time, thus applying to emitting activities that would otherwise cause PM-10 exceedances at different places in the future. These considerations make the approach consistent with, and somewhat superior to, the idea of basing an attainment demonstration on "controlling" sites, per the *PM-10 SIP Development Guideline* (section 6.4.2).

A final argument supporting the microscale approach is that for fugitive dust sources, validation of a model used at this local scale seems more likely than on a large scale, for which of necessity the inventory inputs must be more generic, and represent more numerous sources. This

also applies to the temporal scale: model replication of a 24-hour event requires more tailored emission inputs than would modeling for the annual PM-10 standard. Finally, given limited resources, it makes sense to thoroughly examine what are known to be the main pollution problems, based on past observation and analysis.

Regional analysis. Although there is solid reasoning underpinning the microscale approach, there was concern that for a large urban area the sheer number of sources, especially fugitive dust area sources, could make for a pervasive “regional” component of PM-10 in addition to the more localized or “microscale” component. Additionally, a portion of PM-10 is fine particles, which can stay suspended longer and so can be transported greater distances than coarse particulate.

Fine particulate includes secondary particulate, which form chemically in the air from precursors like ammonia and oxides of sulfur and nitrogen. Secondary particulate is formed by chemical reactions in a mixture of emissions from various sources, spread over hours and a spatial scale of 10's of km. Like ozone, it is a regional pollutant, and so needs to be modeled on a larger scale. Though only a small fraction (4 percent) of the total PM in the Maricopa area, secondary particulate is present. While this “regional component” could partly be addressed by adding a background concentration to microscale modeling, the determination of a “background” is ambiguous since it includes the effect of sources similar to those in the microscale domain. For these reasons, we required that the MAG plan include regional modeling.

Note on annual PM-10 standard. The 24-hour PM-10 standard is addressed by both microscale and regional analyses. However the annual PM-10 standard is addressed only via a regional analysis; there is no localized analysis of the annual standard. While this could have been done, it was not, for several reasons. The main reason is that the microscale study during 1995 was focused on the 24-hour standard, which the area exceeded to a greater degree than it did the annual standard, and for which a timely response to the court order was possible. Also, it was felt that the hypothesized “regional component” that could be handled in a regional analysis was more likely to show up on an annual basis, since by assumption it involves a larger temporal and spatial scale than the microscale component. We view the microscale analysis as something additional and valuable that was performed for the 24-hour standard, rather than as an analysis necessarily required for both standards.

4. Microscale Analysis (ISC)

This section discusses modeling in the 1997 Microscale plan, and is very similar to the corresponding portion of our TSD for the rulemaking on that plan.

Model selection and domain definition. The choice of the ISCST2 model (Microscale plan TSD, p. 4-12) for analyzing sub-areas is in accordance with EPA guidance (*GAQM* 7.2.2). FDM, the Fugitive Dust Model, might also have been considered, given its ability to model the effect of an area source within the boundaries of the source itself. The area source algorithm in ISC2 does not have this capability. Still, given FDM's other limitations, ISC2 is a reasonable choice, and is

an EPA-approved model, as discussed above. (If the work could have been done later, ISC3 would have been appropriate, since it uses FDM's improved area source algorithm.)

The domain definition description does not fully explain how changes in emission density or local meteorological measurements were used in determining the boundaries. The microscale plan implies or states (Microscale plan TSD, p. 4-2, 4-23 ff, 4-37 ff, 5-2) that SCREEN2 and ISCST2 were used to see how near a source had to be to have a noticeable impact at the monitor, and also to see which areas needed higher resolution because of their greater influence at the monitor. (See also discussion of background concentration, below.) It is implied that this analysis was used to reduce the sizes of the modeling domains to just the contributing source areas. This seems like a reasonable approach, but a more complete explanation and would have been helpful.

An emission grid cell size of 400 meters was chosen for the West Chandler sub-area, with the domain initially a square 6 miles on a side, then reduced to a single square mile (Microscale plan TSD, p. 5-1). The cell size for Gilbert (202 m) is smaller (Microscale plan TSD, p. 4-3), but even this seems coarse for a modeling receptor grid for a "microscale approach." The domain for Gilbert ended up being a single city block, a rectangle about 1/4th of a mile on a side.

Meteorological and emissions inputs. As described in the microscale protocol, the microscale study took place throughout the 1995 year. In addition to the standard AP-42 emission methodologies, and some other prior special studies for particular source categories cited in the submittal, the microscale study included field surveys, aerial photography, examination of activity logs, and interviews with source operators. This resulted in a substantially better emissions inventory data than is usually available, overcoming this difficulty of previous efforts. In addition, the use of portable PM-10 samplers and on-site meteorological measurements further enriched the database, though this information is not summarized in the submittal. Together, these provided a strong basis for the microscale modeling.

No local wind data or windroses are provided for either the West Chandler or Gilbert sites, though the Microscale plan notes that meteorological monitoring was done for each modeled sub-area, and summaries of the exceedances' meteorological conditions are provided (Microscale plan TSD, p. 3-1 ff). At one point the plan states that upper air data from Tucson was used; at another it states that "pseudo" data was used; at yet another it mentions data from the Bullhead City SIP. In any case, what the data to use is somewhat of a judgement call, as nearby upper air data is typically not available, so this is not a major issue, though again a fuller description would have been useful.

Site selection. The rationale for the choice of sites is explained in the protocol, and in the submittal (Microscale plan TSD, p. 2-2). Based on past emissions inventory and modeling work, the agencies identified several fugitive dust source categories as being especially important for PM-10 exceedances, mainly urban lots, highway and other construction activities, agricultural activities, and some known industrial sources. Sites were chosen in areas of high emissions

density: South Phoenix for its mix of urban sources; Salt River for its proximity to industrial sources; West Chandler for its nearby highway construction; and East Chandler for its mix of urban and agricultural sources. Later, the Gilbert and Maryvale sites were added because of the exceedances observed during the field study. These are characterized by nearby agricultural land and by park landscaping (i.e., a large area of disturbed, unstabilized ground), respectively. These sites represent a good cross-section of the emission sources known in the Maricopa area, and given the monitored exceedances can be considered representative of exceedance conditions. It cannot be known with certainty whether they are “worst case” in the absolute sense, given the necessarily finite number of monitors, but are certainly a good choice from among those available, and address the standard exceedances that were observed.

East Chandler was later dropped, because there was insufficient source activity information to develop a useable modeling inventory. This is regrettable, but the West Chandler exceedances turned out to have the similar causes, stemming from windblown dust during high winds from a mix of urban and agricultural sources. In addition, the Gilbert site had similar source characteristics, a mix of urban and agricultural sources. Thus, the dropping of East Chandler is not a problem for the attainment demonstration. It was reasonable not to attempt to model it without the detailed emission information necessary to the microscale approach.

Episode selection. Episodes were selected from among exceedances observed during the 1995 field study; this is appropriate given the basis of the microscale approach is modeling of days for which an intensive database is available. The submittal (Microscale plan TSD, p. 4-16) stated that a single episode day was to be chosen, but since in the microscale approach each event and site is modeled independently, this was not strictly necessary. In any case, because of data shortcomings for the other days, the selected episode, April 9, 1995, was definitely the best choice for the West Chandler and Gilbert sites.

Background concentration. Modeling accounts for the natural and anthropogenic sources that are not explicitly handled in the modeling analysis; the background is added to the model predictions. In EPA guidance (*GAQM* 9.2), background is to be determined from a regional background monitor, or from monitor(s) that affect the receptor during meteorological conditions of concern (e.g., upwind). Ideally, a background monitor is not itself influenced by nearby sources. An additional component of background is that due to nearby sources, which in multi-source areas should be explicitly modeled; *GAQM* suggests trial and error analyses to help determine which nearby sources should be included in the modeling.

The latter component is dealt with though the definition of a modeling domain (Microscale plan TSD p. 4-24 ff), in which SCREEN and ISC were used to delimit the region contributing substantially to the microscale monitor locations. The Microscale plan appears to be in accordance with *GAQM* recommendations in this area.

The plan (Microscale plan TSD, p. 4-15 ff) lists the steps used in developing background concentrations for sites other than Salt River, but is not clear, and does not state how the final

cell backgrounds and isopleths were used in the modeling. Wind speeds and directions for particular hours are stated to have been used in determining which grid cells influenced the monitors, but it is not clear how. Assigning a background concentration to a cell based on its land use being similar to the land use of a monitor, which seems also to be stated, would not be making use of that wind influence information. Still, even if this is what was done, it would not be a bad procedure, given that the predominant influence at a point will typically be the land use nearest that point. (An alternative would have been to express each monitor's concentration as the sum of the cells influencing it for each hour's wind speed and direction, and from these to tease out the individual cell-monitor contributions, perhaps by regression.)

The use of neighborhood scale monitors for determining background is appropriate — microscale sites with known nearby sources could not be used as background. Still, this choice underlines a limitation of the microscale approach: these monitors have PM-10 concentrations above natural background, yet are assumed not to be influenced by nearby sources — i.e., a microscale approach cannot explain concentrations at these monitors. The term “microscale” is used in a different sense in the submittal than in the our regulations on monitoring (e.g. 40 CFR 58). In these regulations, “microscale” means from several to 100 meters, “neighborhood scale” means from 500 to 4000 meters, i.e. roughly one third to 2½ miles — the latter are approximately the scale of the submittal's "microscale" modeling domains. It seems puzzling that this size is what a “background” monitor represents, but also the size of the area that must be explicitly modeled. Alleviating this difficulty would require that the background sites themselves be modeled — but that would lead to regional scale modeling, which would be outside the microscale approach. Overall, within this approach, the chosen method is perhaps the best that could be used.

In any case, the method used apparently worked well, considering the decent agreement between model and observation. In addition, as mentioned above, the constant background represents a conservative attainment approach, and in any case represent a regional scale issue addressed in the regional analysis.

Model validation. Tables 5-1 and 7-2 of the Microscale plan's TSD (p. 5-4 and p. 7-17) compare model predictions to the observations. Though a full model evaluation need not be done, ideally there should have been an evaluation of model performance at more than just at one point, which in the submittal was the monitor or nearby. Isopleths of model predicted concentration would aid in this, as would quantitative comparisons to any monitoring data available from portable samplers used during the study.

Model predictions' agreement with observation is not great, but also not terrible (from Table 5-1, p. 5-4 and Table 7-2, p. 7-17):

TABLE MOD-2 PM-10 MICROSCALE MODELING PREDICTION WEST CHANDLER AND GILBERT µg/m³				
SITE	SITE OBSERVATION	ISCST2 VALUE	BACKGROUND	PREDICTION
West Chandler	463	235	80	315
Gilbert	182	123	90	213

Source: Microscale plan TSD, Table 5-1, p. 5-4 and Table 7-2, p. 7-17

It is notable that the background is a high percentage of the total. This indicates a limitation of the microscale approach, the key assumption of which is that exceedances are caused by nearby sources. If that were completely true, one would expect the backgrounds to be lower. Nevertheless, overall this is good performance. Gaussian dispersion models do well to predict concentrations at a particular time and place within a factor of two, while remaining reliable for predicting the maximum over a set of times and places, such as for standard compliance demonstrations.

Attainment demonstration. The Microscale plan's attainment demonstration approach within each sub-area or modeling domain was proportional rollback, based on dispersion modeling. Every attainment demonstration for an inert pollutant is implicitly proportional rollback, so this is acceptable (though the term is often associated with the Chemical Mass Balance model, CMB). The basic rollback assumption is that a given percentage reduction in emissions yields the same percentage reduction in concentration at the receptor — concentrations are "*rolled back*" by emissions changes. The assumption is applied to each source individually, and the individual source changes are added in *proportion* to the sources' contribution to the observed concentration. This can be stated in terms of a formula: let each source i have emissions E_i and contribute X_i to the concentration at the monitor; controls change emissions by ΔE_i , leading to in concentration changes ΔX_i . With this notation, the basic rollback assumption is $\Delta X_i/X_i = \Delta E_i/E_i$, and the total effect ΔX of source emission reductions ΔE_i is:

$$\Delta X = \sum_i X_i * \left(\frac{\Delta X_i}{X_i} \right) = \sum_i X_i * \left(\frac{\Delta E_i}{E_i} \right) = \sum_i \Delta E_i * \left(\frac{X_i}{E_i} \right)$$

Each source's emissions are rolled back by a percentage, $\Delta E_i/E_i$, the monitor effect of which is proportional to its contribution X_i . For an attainment demonstration, the reductions ΔE_i must be set so that the sum of their effects is enough to bring the total concentration (including background) down to the Standard. In CMB, the (X_i/E_i) "dispersion factor" is determined through chemical analysis of monitor samples; in ISC and other dispersion models it is determined by dispersion algorithms. For CMB, the "dispersion factor" is assumed independent of distance, but for a dispersion model it varies, allowing a lessening of effect with distance from the source.

The model should be used to evaluate the effectiveness of controls throughout the entire modeling domain — "proportional rollback" at every receptor point. A control strategy sufficient for attainment at the monitor or at the maximum modeled receptor might not be enough at other receptor points, where source contributions would be in different proportions because of the varying distances between the receptors and the sources. There is no information in the submittal about the model receptors chosen (i.e., at what points in space the model is used to predict concentrations). At places the Microscale plan seems to imply that the receptor and inventory grid cell sizes used were the same; they need not have been, and a smaller inventory grid cell size could have reduced the impact of limitations in the ISC2 area source algorithm. On the other hand it could be argued that grid spacing was appropriate given the coarse resolution of available land use information, and in any case this is not a crucial issue, given that the dominant sources are area sources with emissions distributed over the area, rather than point sources. At other places the submittal seems to imply that only the monitor location was used as a model receptor.

Overall, this receptor issue might be important for the Gilbert and West Chandler sub-areas, with their mix of agricultural and construction sources. An array of points within each modeling domain should have been evaluated for standard attainment. Evaluating only at the monitor is weaker than using a full set of receptors throughout the domain, yet still is consistent with the idea of showing attainment via "controlling" sites, per the *PM-10 SIP Development Guideline* (section 6.4.2).

The tables in the initial summary show that the current and planned RACM and BACM are sufficient for attainment at sites of the maximum concentration within each sub-area. While not stated in this portion of the Microscale plan, the controls listed in Tables 4-2 through 4-5 involved enforcement of existing Rule 310 (except for the agricultural source controls), which could be implemented by December 31, 2001. As the sub-areas are representative of the sources and conditions that lead to exceedances, for the Maryvale and Salt River sites this constitutes an adequate attainment demonstration for the 24-hour PM-10 standard within the context of the microscale approach, with BACM implemented. We approved these attainment demonstrations in our action on the Microscale plan. 62 FR 41856, 41862. However, it did not constitute an adequate demonstration at the West Chandler and Gilbert sites because their contributing sources were not subject to Rule 310, consequently, we disapproved these attainment demonstrations. 62 FR 41856, 41862. (Exceedances due to regional scale processes were to be addressed in the MAG plan submittal).

5. Supplemental microscale analysis for Gilbert and West Chandler sites

This section discusses the supplemental microscale modeling included in the 1999 MAG plan, and performed for the Gilbert and West Chandler sites, for which the 1997 Microscale plan did not demonstrate attainment. A description of this modeling appears in the ADEQ TSD found in Appendix C, Exhibit 3 of the MAG plan.

The approach used for this modeling was essentially the same as that already discussed in the previous section of this TSD, with three differences. First, it uses a new calculation of background concentrations to add to the model predictions (see below). Second, it evaluated concentrations at multiple locations, rather than just at the monitor, resulting in a more robust attainment demonstration (ADEQ TSD, page 3-8). Finally, it evaluated various sets of agricultural control measures with hypothetical control efficiencies, in order to determine the emission reductions needed for attainment. It was shown that even with full implementation of MCESD's Rule 310, attainment could not be demonstrated by 2001 (ADEQ TSD, tables 3-1 and 3-2). However, emissions reductions are sufficient for attainment in 2006 at the West Chandler site with the application of a 70 percent BACM control efficiency for vacant lots, and 58 percent control efficiency for agricultural aprons and fields. For the Gilbert site, only 20 percent emission reductions were shown to be needed from agricultural sources. The 58 percent reduction is the target set in 1999 for the agricultural best management practices, which were submitted in 2001 (see section below).

6. Regional Analysis (UAM-LC)

This section discusses area-wide modeling in the MAG plan, and is very similar to the corresponding portion of our TSD for our proposed action on the annual standard provisions in this plan.

Attainment is demonstrated when sufficient emission reductions are in place so that modeled concentrations in every grid square are below the standard.

MAG showed that with additional controls (including BACM), peak 24-hour PM-10 concentration in 2006 is $112.6 \mu\text{g}/\text{m}^3$, which is below the standard at $150 \mu\text{g}/\text{m}^3$, thus demonstrating attainment (MAG TSD, Table VI-3, p. VI-12).

Choice of model. As discussed above (section on “conceptual evaluation”), generally receptor models are of little use in an area dominated by fugitive dust; this leaves dispersion models, of which there are several types. Both *PSDG* and *GAQM* recommend the ISC model (“Industrial Source Complex” model) for source-specific analyses, and RAM or CDM for urban-wide analyses. These latter two models are now outdated. The current dispersion model is ISCST3; it has all the capabilities of RAM and CDM, and could be considered the EPA-recommended model for both source-specific and urban-wide analyses of PM-10.

RAM, CDM, and ISCST3 are all steady-state Gaussian plume models. "Gaussian" means that the concentration through a cross-section of a pollutant plume from a source has a bell-shaped Gaussian or normal distribution; "steady state" means the plume is assumed to extend in a straight line downwind of the source for a given hour; there is no carry-over of conditions or pollutants from hour to hour. None of these models can simulate secondary particulate formation, so when using them secondary particulates have to be handled in some other way (for which there is no EPA guidance). The steady-state Gaussian plume type of model can be adequate for many circumstances, especially for short-range pollutant transport from well-characterized sources in steady, non-stagnant winds. However, when secondary particulates are of concern, or when there is specific interest in regional effects like transport of PM-10 through or within the area, a Gaussian model's simplistic portrayal of meteorology and plume transport is unlikely to be adequate and another type of model should be used.

For urban area ozone and CO SIPs, we recommend the use of the Urban Airshed Model (UAM) or a model of comparable ability and performance. UAM is an "Eulerian" dispersion model using a grid to represent an area, with multiple vertical layers. Wind and other meteorological variables can vary in each grid cell. Pollutants move between the three-dimensional set of cells, undergoing diffusion, transport, and chemical reactions as they do so. UAM thus provides a far more sophisticated portrayal of the atmosphere than ISC, with more complex interactions between meteorology and emissions. The disadvantage of UAM is that it is correspondingly more difficult to prepare inputs for and to troubleshoot, and as a result requires greater time and expense to run.

We recommend UAM (run in an inert chemistry mode) for carbon monoxide modeling, and with the Carbon Bond IV chemical mechanism for ozone modeling, but there is no EPA-recommended model for secondary particulates. The UAM-LC model has been used in the South Coast (Los Angeles) Air Basin where there is elevated ambient concentrations of secondary particulates. The "LC" designates a Linear Chemistry scheme, a simplified version of the complex chemistry of secondary particulate formation. Because of its relative simplicity, the LC scheme makes it possible to perform simulations more quickly and economically, an important advantage for simulating PM-10 concentrations where a large number of modeling runs are performed, as was done for the Maricopa SIP.

In summary, given the need to model regional scale phenomena, the shortcomings of steady-state Gaussian models, the desirability of modeling secondary particulates, and the status of UAM in EPA guidance and previous SIP modeling exercises, UAM-LC seems a logical choice for modeling PM-10 levels in the Phoenix area. Appendix I of the MAG plan's modeling TSD, including the modeling protocol and its attached concept paper, follows essentially these same arguments. Since UAM-LC performed reasonably well for the Phoenix Area, we propose to find the MAG plan's choice of UAM-LC to be approvable.

Episode selection. For a short-term standard, such as the 1-hour ozone standard or the 24-hour PM-10 standard, the selection of which air pollution episodes to model is a crucial one and must

adequately account for the meteorological and emissions conditions when concentrations tend to be high, as well as data availability for those episode days. The decision in the MAG protocol to model every sixth day, as well as all the exceedance days during the microscale study, nicely addresses this issue and the need to analyze day or episode types. Also, it uses days for which there are PM-10 monitoring data (a key consideration), and results in enough days that it is likely a good selection of day types has been modeled. In total, 65 days were modeled altogether.

In an area with high secondary particulate concentrations the selection of individual days might pose a problem, as the secondary chemistry can require multi-day episodes to develop high concentrations (as do some episodes in the South Coast Air Basin and the San Joaquin Valley); but since secondaries are not the main problem in Maricopa County, this is less of a worry for acceptability of model predictions for total particulates (though it might compromise the model's performance for secondary particulates).

Whether multi-day buildup of PM-10 concentrations due to fugitive dust occurs in Maricopa County is not discussed in the MAG plan. However, since each day is modeled with an initial "spin up" day preceding it, as is customary in UAM modeling, short multi-day episodes would likely be adequately handled. Longer episodes would not perform well, and this would become apparent later. Since no such problems were mentioned in the submittal, this was presumably not an issue. The possibility of multi-day episodes might have been good to examine, especially if secondary particulates were more of a concern.

One final problem with modeling so many days is that less time can then be spent making sure each one is performing reasonably, which is an issue for this submittal, as discussed below. But on balance, the choice to model a large number of days for which monitoring data is available is a reasonable one.

Domain and grid resolution. As the modeling domain, MAG chose the Maricopa County portion of the Maricopa PM-10 nonattainment area. This choice of domain is good for this modeling exercise because its boundaries are in areas with low emissions, it includes the metropolitan area's emissions, and modeling will not tend to be driven by relatively uncertain conditions at the boundary.

Horizontal grid resolution was 2 km, on the low end (higher resolution) of our recommended values (*Guideline for Regulatory Application of the Urban Airshed Model*, section 3.3, hereafter "GRAUAM").

The vertical grid matched the typical UAM application with two layers below the mixing height (height below which the atmosphere is fairly well-mixed) and three layers above. The minimum lower layer thickness was 40 m, whereas GRAUAM 3.4 recommends 50 m. This initially confines emissions to a thinner layer, leading to higher concentrations, other things being equal. Previous applications of UAM for CO modeling in the Phoenix area and elsewhere have

used an even smaller minimum thickness which seemed to be needed for adequate model performance. This difference in minimum lower layer thickness is not of large concern.

The minimum upper layer thickness used was 500 m, whereas *GRAUAM* 3.4 recommends 100 m. This larger layer thickness is consistent with the relatively large mixing heights during the summer in the southwestern United States and also with a large value for the overall height (REGIONTOP) for the 3-D modeling grid.

The MAG TSD contains no documentation explaining the reasoning behind the choices for grid resolution; however, the choices appear reasonable as they are within the range of values typically seen in applications of the UAM model.

Wind, temperature, and mixing height fields. The EPA-recommended wind model for input to UAM is DWM, the Diagnostic Wind Model. The MAG plan used CALMET, which is comparable in functionality to DWM. Both wind models adjust wind flows according to terrain and interpolate between meteorological monitoring site observations of wind speed and direction. CALMET also handles temperature, and can help in determining mixing heights.

Data from several local meteorological networks were used. A considerable amount of preprocessing of the data was required to ready them for CALMET because they were in different formats. Appendix III of the MAG TSD gives example hourly plots of wind speed and direction in two vertical layers for one of the days modeled. They look reasonable, but other than a discussion in the quality assurance section (MAG TSD, pp. III-18 and III-20) of anomalous winds in layer two in the initial runs, there is no discussion of the wind field, which would have enhanced confidence in the model.

Upper air soundings are used to determine the appropriate mixing height. Because complete upper air sounding data is lacking for the Phoenix area, it is necessary to use some creativity in determining a mixing height field to use with UAM. The MAG TSD (p. III-11) describes a semi-automated procedure for filling in gaps in the nearby Luke Air Force Base soundings with Tucson soundings and Sky Harbor Airport surface data. Given the available data and the large number of days being modeled, this approach is reasonable. Again, other than the description on how they were derived and changes made during the diagnostic stages (MAG TSD, p. III-19), there is little discussion of the mixing heights used in the model and their reasonableness.

UAM-LC was modified to enable a more reasonable handling of the Phoenix area's typically spotty precipitation, which in the original UAM model is handled in too much of an "on/off" fashion. The modification enabled a more realistic treatment of wet scavenging of pollutants, especially precursors to secondary particulates, which were thus prevented from being effectively zeroed out by the model. This approach was a good way to adapt the available modeling tools to the particulars of the Phoenix area.

More discussion of the meteorological fields would have been desirable. In addition to the MAG TSD's abbreviated description of the procedures followed in developing the fields, an account of the fields' physical reasonableness and how they help determine PM-10 concentrations would have been helpful in evaluating the application of the model. While MAG appears to have used reasonable procedures in developing the fields, it is difficult to determine the reasonableness of the results, although we note that the large number of days modeled partly justifies the lack of detail.

Initial and boundary conditions. Initial conditions are the starting concentration values for all the pollutants modeled. Boundary conditions are concentrations that apply throughout the simulation at the edges of the modeling domain and can represent the quality of air that is being transported into the area.

For the initial and boundary conditions for primary particulates, MAG used sampling data from around the modeling domain, with adjustment to ensure that secondary particulates were not double-counted, and incorporating upwind monitoring data for days dominated by high winds.

Initial and boundary conditions for secondary particulate precursors were set at background values taken from EPA guidance and previous applications of UAM-LC in the South Coast Air Basin. These values are appropriate for a relatively isolated urban area like Phoenix where high concentrations are not expected at the edges of the fairly large area encompassed in the modeling domain.

Thus the selection of boundary conditions was a relatively straightforward process and appears acceptable.

Model emissions. Chapter II of the MAG TSD gives a good overview of the process of spatially and temporally allocating emissions to every grid square for every hour modeled. The emission model used, EPS2.0, is EPA's standard emissions preprocessor for use with UAM. It provides a tool for allocating emissions in space and time for input into the model and allows the use of different surrogate variables for allocating different emission categories. Ideally, emissions should reflect activity levels for each hour, as well as the hourly wind and temperature for those source categories whose emissions depend on these variables. In practice, often only profiles of typical daily activity are available which are sometimes broken down by season, month, weekday vs. weekend, or day of the week.

Appendix II, Exhibit 1 of the MAG TSD documents the results of some sensitivity testing on this issue, reporting modeling results showing that the PM-10 modeling results varied very little between seasons; as a result, only two inventories -- for weekday and weekend -- were retained, instead of the eight used in earlier (pre-submittal) modeling work. This is partly because day-specific temperatures make essentially no difference in primary particulate emissions. Because secondary particulates are relatively low in the Phoenix area, a day-specific

precursor emissions inventory (that is, NO_x, SO_x, and ammonia) is correspondingly less important. (Note that the chemistry of secondary particulates is still day-specific in the submittal, as the temperatures used in UAM-LC itself to drive the chemistry were derived from CALMET and actual temperature observations.) Thus, EPA agrees that using just the two inventories (weekday and weekend) was reasonable.

Quality assurance, diagnostic testing, sensitivity testing. The purposes of quality assurance, diagnostic testing, and sensitivity testing overlap somewhat. They have in common providing assurance that the model base case is performing in a reasonable way and confidence that the model will be reliable when used to assess the future effect of control measures. See *GRAUAM*, chapter 4.

Quality assurance focuses on uncovering mistakes in the inputs before the model is run, typically by range checks and graphical plots.

Diagnostic testing involves running the model, possibly with some alternative inputs, to check the model's ability to replicate a given pollution episode. This testing may uncover additional input errors, such as those caused by inputs that are reasonable in themselves but are not consistent with each other. An important goal is to improve model performance, while keeping the inputs scientifically reasonable. (See also discussion below on "counter-balancing errors".)

Sensitivity testing involves typically large changes in model inputs to assess the model's response (that is, sensitivity) to them, to ensure that the response is physically reasonable. It can uncover errors as well as indicate the inputs to which the model is especially sensitive. The latter can be used as a guide to focusing additional input development efforts and possibly control measure development.

The minimal set of sensitivity tests listed in *GRAUAM* are: 1) zero emissions, 2) zero boundary conditions, 3) varying mixing height and wind speeds. The first test is typically more useful as quality assurance than as a sensitivity analysis, though in combination with zeroing out the boundary it can help assess the extent that air quality is driven by transport of pollutants from elsewhere.

The MAG TSD contains no documentation that either the zero emissions or zero boundary conditions test were performed. Some diagnostic testing for mixing height and wind speed was performed, so this *GRUAM* recommendation was at least partially addressed. Overall the modeling in the MAG plan did not seem to perform the standard set of sensitivity tests typically done in ozone SIP submittals. Though *GRUAM* was developed for ozone and is not binding on PM-10 submittals, this lack of sensitivity testing is somewhat troubling considering that the regional PM-10 modeling is of comparable complexity to that done for ozone.

The MAG TSD discusses quality assurance of the UAM-LC inputs only briefly (p. III-18), describing range checks of inputs and outputs for the CALMET meteorological program including automated range checking for winds, temperatures, and mixing heights, and visual checks of these plotted against time. During this check, a problem with one vertical layer of winds was found and corrected by changing some CALMET inputs, including the method used to calculate the mean wind for the modeling domain. The MAG TSD in Appendix III, Exhibit 1 provides example plots of the wind fields for the highest PM-10 day (November 29, 1995); however, it is not clear from the document whether such plots were prepared for other modeled days or to what extent those plots were used in quality assurance.

Graphical plots were also made of emission density and of the surrogate factors used to allocate emissions across the modeling domain, providing a useful quality assurance tool. Altogether, while it is clear that useful quality assurance was performed, its extent is not well documented in the submittal.

Diagnostic and sensitivity testing are treated together in the MAG TSD (pp. III-18 through III-21). The MAG TSD provides example plots of modeled PM-10 concentrations for November 29, 1995 (Appendix III, Exhibit 2). The MAG TSD states that model performance was diagnosed using such plots and other statistical methods though the latter are not described. Overall, the MAG TSD provides a useful narrative describing the sensitivity modeling runs and a sequence of changes made to model inputs as a result of examining model results.

In addition to the alternative wind field correcting anomalously high winds (see above), the MAG plan describes tests on: omission of wet scavenging, a shorter model "spin up" period, smaller nitric acid deposition rate, an alternative (Holzworth) mixing height scheme, UAM's layer configuration, and temperature sounding data from a lower height.

The model was found to be insensitive to wet scavenging changes. It was also found to be insensitive to length of spin up period. Days with relatively constant meteorology were chosen for this test, to maximize the effect of the initial conditions; since there was very little difference between the use of one or two spin up days, it was decided to just use one (MAG TSD p. III-21). This was a very reasonable procedure and decision, which saved considerable computer run time.

The MAG TSD describes the nitric acid deposition factors in the UAM-LC model as being too small, though it does not state the reasoning for this conclusion. Increasing the factors by a large amount, thus decreasing the rate at which nitric acid is removed from the atmosphere by deposition, had the effect in the model of only slightly increasing PM-10. The MAG TSD makes a good point that this small increase is reasonable if there is only a limited amount of available ammonia; then there would not be enough ammonia to combine with the increased nitrate to form new secondary PM-10 in the form of ammonium nitrate. However, the MAG TSD does not cite evidence of this ammonia-limited atmosphere. In fact, an earlier study concluded that ammonia in Phoenix is abundant, at least for the period it covered.

However, the insensitivity of the model to this nitric acid deposition factor means that the particular value used is not crucial, so the specific question of nitric acid deposition is resolved. However, if ammonia is indeed abundant, the lack of sensitivity may indicate serious problems in how the model is handling secondary particulate chemistry. This issue is not addressed in the MAG TSD because of the assumption that ammonia was limited.

Given the lack of local upper air sounding data, it was appropriate to examine the sensitivity of the model to alternative ways of supplying input to CALMET for determination of mixing height, which is an important UAM-LC model input. Which height from the Tucson data should be used as input for the first vertical layer in CALMET is a judgement call, as are many of the other CALMET inputs. Using a slightly lower (and thus higher pressure) level was a reasonable diagnostic/sensitivity simulation to try, and is described in the MAG TSD (pp. III-20 - III-21). The small resulting difference in modeled concentrations lends confidence that this particular parameter's precise value is not critical.

The methodology for determining mixing height was also examined, at least for the nine days with the highest PM-10 concentrations. This review is important because a lower mixing height makes for less volume for pollutants to disperse in, and thus resulting in higher concentrations. The MAG TSD (p. III-19) states that mixing heights from CALMET tended to be much lower than those derived from the Holzworth method (a standard method used in many model applications). Together with UAM-LC over-predictions of PM-10, this suggested that the CALMET mixing heights were too low and they were scaled up, though the exact procedure used to do this is not documented.

Since two lines of evidence indicated mixing heights were too low, and there were not local upper air soundings to verify against, it was reasonable to adjust mixing heights upward. But we note that the model was *under*-predicting for July, and the decision not to adjust July mixing heights seems to have been based solely on the effect on PM-10 concentrations, not on meteorological reasoning. UAM-LC could have been over-predicting for the other months for reasons other than mixing height; selectively "correcting" the over-predictions risks obscuring other potential problems. Given the overall sensitivity of pollutant concentrations to mixing heights, it would have been desirable to perform more extensive meteorological diagnostic testing, as well as other analyses aimed at uncovering possible additional reasons for the over-prediction and possible interactions between different parameters.

In a similar vein, the decision (documented on p. III-20) to use two model layers below the mixing height and three above (instead of the reverse) seemed to be driven by the consideration that this arrangement helped lower the modeled PM-10 over-predictions to improve model performance, though this is not totally clear from the MAG TSD. The documentation mentions weak diffusive transfer due to a slightly stable atmosphere; however, according to one plausible reading of the language in the MAG TSD, it would seem that this stability ought to suppress vertical transfer and thus keep pollutants more concentrated, rather than decreasing concentrations as it was stated to. Thus the reasoning of the MAG TSD is

unclear on this point. Either arrangement of layers is acceptable, but the choice should ideally be based more on meteorological reasoning and how that meteorology is portrayed in the model, and less on the goal of improving model performance statistics.

We would also like to have seen additional diagnostic testing involving secondary particulates to ensure that the chemistry is working as it should, e.g., scaling the emissions inventory of one or another precursor. Complexities of the chemistry and of the types of errors that can occur make this especially important for areas with large secondary concentrations. Again, the dominance of primary particulates in Phoenix area makes this less of a concern for conclusions about total PM-10, though the lack of this diagnostic testing raises questions about the model's reliability for predicting the secondary component.

Taken together, these particular diagnostic/sensitivity tests show that substantial analysis of what was going on inside the model was performed during the preparation of the plan submittal. Such analysis is important because improving an over prediction is not in itself a sufficient reason for changing an input parameter. It is important to "get the right answer for the right reason." Using model performance as a guide to changing inputs is necessary, but doing so without understanding how the model is working runs the danger of obscuring other problems in the model inputs or the model itself. Counterbalancing errors may yield adequate base case model performance, yet cause the model to do poorly when emissions are extrapolated into the future. There is no evidence that counterbalancing errors occurred in this MAG plan's modeling, but neither is this potential problem explored fully, and the documentation leaves the impression that improved performance may have been accepted too readily as justification for model input changes.

In defense of the plan's modeling, the dominance of chemically inert primary particulates in the ambient air makes it less likely that hidden counterbalancing errors would make themselves felt in the attainment demonstration. Interaction of the meteorological and other parameters can have profound effects when atmospheric chemistry is involved as it is for ozone and secondary particulate formation. However, secondary particulate contribute only 2-10 $\mu\text{g}/\text{m}^3$ or around 4 percent of the PM-10 concentrations in the Phoenix Area. In addition, the large number of days modeled necessitated a streamlined, and somewhat mechanical approach to the diagnostic analysis. Finally, the diagnostic/sensitivity tests that were performed provide a reasonable substitute for many of the standard sensitivity tests recommended in the *GRAUAM* ozone guidance, for purposes of model performance for primary particulate.

One additional element that EPA would have liked to have seen in the MAG TSD is a "conceptual model" of PM-10 exceedances in the Phoenix area. A conceptual model would have identified the primary factors that lead to elevated PM-10 concentrations. Of course, especially high emissions on days with high PM-10 concentrations is an important part of such a model and may be the only important factor contributing. But, for example, a conceptual model might also describe local wind patterns, the location of sources, and their interaction with other meteorological parameters as a typical day unfolds.

In the modeling for the MAG plan, the highest predicted PM-10 concentration is in the north-northeast corner of the domain center (at cell 33,36). No explanation is given as to why the highest modeled levels are there. It is puzzling that the concentration is so high there and so much higher than its immediately surrounding grid cells, because there are no nearby cells with especially high emissions density that would readily explain it. Nor is there an explanation in the attainment demonstration why the modeled control measures are effective at reducing this peak (lack of “conceptual model”).

While not strictly speaking a requirement for plan submittals, a conceptual model helps to guide diagnostic testing and possibly gives a sense of which control measures would be most effective. It would also help the public better understanding the modeling and its results and provide everyone assurance that the PM-10 problem is well enough understood to be adequately handled in an air quality model.

Despite all of the criticisms discussed above, we find the modeling approach in the MAG plan acceptable because at worst the result is a form of “modified rollback” which we have accepted in the past for PM-10 SIPs and is supported by our guidance on a case-by-case basis (*GAQM 7.2.2*).

Straight rollback would assume that a given percent reduction in emissions yields the same percentage reduction in concentration. In modified rollback there is also direct scaling, but the concentration may not have the same percent reduction as the emissions do (see also section D.6 above on straight proportional rollback). In the MAG modeling, when emissions decline by 32 percent (from 191 to 130 metric tons per day), the modeled ambient concentration at the highest monitor declines by 59 percent (from 326.3 to 112.6 $\mu\text{g}/\text{m}^3$). (MAG TSD, p. VI-2, III-42, and VI-12.) The rollback is “modified” in that data and reasoning — in this case the UAM-LC model — are used to make a more intelligent assessment of the effect of emission reductions. Despite the problems cited above, the modified rollback approach used is a more sophisticated approach than straight rollback, taking into account the timing and location of emissions, and transport and dispersion of these through meteorology, over a larger number of days than has been modeled in any previous PM-10 plan.

In summary, the modeling approach is acceptable because even if all the above criticisms are valid, it is still an improvement over rollback, which in itself would be acceptable.

Performance goals and evaluation. A summary of model performance is provided in the MAG TSD, but there is no detailed look provided for any given episode day. This level of detail would be difficult to do for every day modeled, but examination of a selection of additional days would improve our confidence in the ability of the model to predict PM-10.

The performance goals set out in the MAG modeling protocol are based on similar statistical goals for ozone in *GRAUAM*, and on the performance of UAM-LC in the South Coast Air Basin. Specifically, the goal was to have the model predict within 50 percent the matched

peak, the bias, and the gross error. (MAG TSD, p. III-25.) There is no EPA guidance on performance goals for regional PM-10 modeling. As a rule of thumb, for individual point source modeling the peak should be accurate within 30 percent; *GAQM* Section 10.1.2 gives a figure of 10-40 percent. Because we are concerned here with not one point source but with a whole region (for which there is little modeling experience) and because of the relative uncertainty in fugitive dust emissions, the 50 percent goals for the three statistics seem reasonable. The model met the performance goals with matched peak under-predicted by 14 percent, bias of 10.8 percent, and gross error of 15.8 percent. (MAG plan, p. III-25, and Table III-8, p. III-37.)

These overall performance numbers are reassuring, though they cannot tell the whole story for something as complex as UAM-LC modeling of an urban area. We also have to be concerned about differences in performance across the modeling domain, and the model's ability to replicate PM-10 concentrations as they evolve throughout a day. We want to have confidence that the model is showing good performance for the "right reasons" as we have discussed above in the section on diagnostic testing. Other than the concentration plots of November 29, 1995 (MAG TSD Appendix III, Exhibit 2), the MAG TSD contains no documentation of how PM-10 concentrations evolve throughout a day; there is no information on how well UAM-LC matches the diurnal PM-10 pattern at particular monitors.

The MAG TSD does contain tables and plots of the observed and predicted peaks for the high PM-10 monitors, Greenwood, Mesa, and North Phoenix (Tables III-6 and III-7, Figure III-5); in addition there is a plot of observations against predictions (Figure III-6). It is clear from this information that observations and predictions are correlated: days monitored to have high PM-10 concentration peaks tend to have high modeled peaks as well. But it is also clear that there is a lot of scatter, many high days are missed, and the fit is not especially close.

The performance of the model for secondary particulate is also far short of ideal. As with the total PM-10, there is some correlation with observations, but mainly secondary concentrations are substantially over-predicted, about 25 percent on average (MAG TSD, Table II-9). The MAG TSD does not discuss the evolution of secondary component throughout a day, or assess the specific chemistry of Phoenix area pollution episodes. It does point out that modeled concentrations are more in line with the values seen in the more intensive DRI study conducted in 1991, so they are not so unrealistic in themselves. (MAG TSD, p. III-38.) The mismatch between the plan's observed and predicted concentrations, however, imply that the model is not performing well for secondary particulate. Since no diagnostic testing on secondary particulate was documented in the MAG TSD, reasons for this poor performance are not explained. Overall, we have little confidence in the model's secondary particulate predictions; however, secondary particulate are a small part of the overall PM-10 problem. In addition, since the attainment demonstration does not rely on reducing secondary particulate, the over-prediction of secondaries tends to make attainment demonstration conservative.

Despite the performance problems and the lack of documentation on some issues, when one considers the unavoidable uncertainties in a modeling exercise, especially in modeling

fugitive dust emissions, the model performance appears acceptable. Additional factors strengthening EPA's conclusions that the submittal uses an acceptable modeling approach and that model performance is acceptable are that there is no EPA guidance prescribing procedures for applying the approach used, and even with the criticisms described here the approach amounts to a form of modified rollback (see above discussion on diagnostic testing).

Demonstrations of attainment in 2006. Simulations of projected 2006 emissions with no additional controls predicted a maximum annual concentration of $363.2 \mu\text{g}/\text{m}^3$ in 2006, demonstrating that the Phoenix area would continue to exceed the 24-hour PM-10 standard without the implementation of additional controls (MAG modeling TSD, p. III-43).

MAG showed that with additional controls (including BACM), peak 24-hour PM-10 concentration in 2006 is $112.6 \mu\text{g}/\text{m}^3$, which is below the Standard at $150 \mu\text{g}/\text{m}^3$, thus demonstrating attainment (MAG modeling TSD, Table VI-3).

When the control measures included in the MAG plan are simulated with UAM-LC for 2006, all grid squares in the modeling domain are below the 24-hour PM-10 standard of $150 \mu\text{g}/\text{m}^3$ thus demonstrating attainment of the 24-hour standard (MAG modeling TSD, Table VI-3, p. VI-12). The maximum predicted 24-hour concentration in 2006 is $112.6 \mu\text{g}/\text{m}^3$, which provides a comfortable margin of attainment.

Agricultural measures and land use issue. In the Microscale plan, it was shown that the Gilbert and West Chandler site needed a 58 percent emission reduction (ADEQ TSD, page 3-9; see above). The agricultural general permit, together with a reasonable estimate of land use change, provide more than the 58 percent needed for attainment at West Chandler. For the Gilbert site, the BMPs by themselves, even without any land use change, provided more than the 20 percent needed for attainment.

An issue not explicitly dealt with in the submittals is how land use change is handled in the microscale approach. The submittals do not deal with this issue completely consistently. The following discussion describes the issue and how we are resolving it in recommending approval for the plan.

Under the microscale approach, the areas around the exceeding monitors are deemed to be representative of locations throughout the nonattainment area; demonstrating attainment at these sites, and applying the controls over the whole nonattainment area, demonstrates attainment for the whole nonattainment area. One aspect of this approach which is not adequately explored in either the Microscale Protocol or any of the submittal documents, is how exactly future projections should be handled. As time passes, land uses will change, and some source types will displace others. For example, in an area dominated by construction activity, eventually most of the construction will be completed, and thus will no longer contribute to emissions in the area. A land use and socioeconomic model, in conjunction with a dispersion model, could legitimately show that exceedances no longer occur in the area. However, just waiting a few years for this to

occur is not acceptable as an attainment demonstration; in a growing metropolitan like that of Phoenix the construction will still be occurring, only in a different areas of the region such as the urban edge. In recognition of this, the Microscale plan assumed a fixed source mix for each microscale area; a given area represented not just the specific study area, but also future ones that would be similar to the one studied. It did not need to project changes in the mix of land uses and sources, because it assumed that the mix would continue to occur, somewhere in the nonattainment area.

For the Microscale plan, ISCST modeling of the mix of land uses and source types during the 1995 study period was used to determine the emission reductions needed for attainment at the Maryvale and Salt River sites. Sufficient controls were adopted to show attainment for those locations with the 1995 mix. However, in the BMP TSD's attainment demonstration at West Chandler, land use was allowed to change. The modeling showed that a 58 percent emission reduction was needed from agricultural sources; the BMP TSD submittal shows that emissions will reduce by 60.3 percent (BMP TSD, p. 4-4). That includes an average BMP control efficiency of 36.6 percent, but also includes reductions from the conversion of 37 percent of the agricultural land to residential and commercial, based on a land use model for the overall nonattainment area. The combination of BMP controls and land use changes just suffices to meet the 58 percent reduction needed, assuming that those new land uses have very low emissions. (BMP TSD p. 28, and BMP Quantification TSD, p. 4-5).

At the actual West Chandler site itself, there was essentially complete conversion of agricultural land to residential and commercial during the 1995 - 2000 period. Emissions figures from the BMP TSD (draft BMP TSD, Enclosure 3, Attachment 4) show that these new land uses have only trivial emissions or are otherwise captured in increased regional activity (e.g., increase vehicle miles traveled). Given the cost of land, it is reasonable to assume that the new housing developments will leave no vacant land, which might not have such low emissions. But as stated above, it would not be acceptable for an attainment demonstration simply to assume 100 percent conversion. The assumption in the microscale approach is that the West Chandler area is representative of similar areas elsewhere. Even if such total conversion could be projected for any given area, there would be an intervening period of high agricultural emissions first, just as there was at West Chandler; there would always be an urban edge with characteristics like those of the 1995 West Chandler area, leading to PM-10 exceedances. A control strategy of simply waiting for agriculture to disappear would not address these exceedances by 2006.

On the other hand, the opposite extreme of assuming no conversion of land at all does not seem reasonable either. The reality is that the metropolitan area is growing and agricultural land is rapidly being converted; this should not be ignored. Such changes have been observed over the past decades, and are projected to continue by the area's socioeconomic models.

Using an estimate from the area's land use model of the conversion to occur by 2006 is a reasonable approach to use instead. It is a compromise between the extremes of the no-conversion and the total-conversion assumptions, and one that is driven by the area's

socioeconomic projections that are used for many purposes, and represent the best available guess and what the overall area will experience.

Also, use an area average figure is consistent with the area wide application of control measures required under the submittal's approach. Reliably predicting the conversion for a particular small area (several square miles in the microscale approach) would be problematic in any case, since it would depend on knowing individuals' purchase decisions and development plans. Aggregate conversion figures, driven by larger economic forces and representing the average of many actions, ought to be more reliable.

In addition, assuming some land use change is more in line with the traditional use of microinventories in EPA's PM-10 attainment demonstration guidance, and also is in line with how attainment demonstrations are performed in general. Typically the projections for land use, employment, industrial production, population, vehicle traffic, etc. are part of the baseline conditions assumed in projecting air quality; in an attainment demonstration they are independent of, but used in conjunction with, estimates of control measure effectiveness. In other words, reductions that occur naturally because of socioeconomic changes are allowed to "count" toward reductions needed for attainment. Conversely, growth, such as often occurs with vehicle traffic, would count the other way, and must be compensated for by additional emission reductions. With a very few exceptions, changes in such underlying socioeconomic variables are deemed outside the scope of Clean Air Act, and outside the jurisdiction of EPA and of air quality control management agencies. Thus, it is reasonable to include the effect of land use changes in some way.

In summary, the approach assumed in 2001 BMP TSD is not completely consistent with how the microscale approach was implemented in the 1997 Microscale plan. Nevertheless, we find that it constitute a reasonable balance between different possible implementations of a microscale approach, and one that is consistent with EPA guidance.

Conclusion. The modeling performed for the MAG plan is as sophisticated as any that has been performed for a PM-10 SIP, combining two independent demonstrations, a microscale analysis and a regional analysis. The microscale approach is consistent with early EPA guidance on PM-10 attainment demonstrations, and appropriately focuses analysis on localized sources. The land use change assumed in association with the agricultural measures is a reasonable balance between an idealized approach and the real world, so that the BMP TSD completes the microscale approach started in the 1997 microscale plan. For the regional modeling, while we have noted several problems associated with its performance for secondary particulate, and several other shortcomings of the modeling and its documentation, the dominance of primary particulate from fugitive dust obviates these concerns. At worst the regional analysis modeling is akin to modified rollback, an approach that is acceptable under EPA modeling guidance for PM-10. (*GAQM* 7.2 and *PSDG* chapter 4). We therefore propose to approve the modeling for the 24-hour standard because it provides a credible demonstration that the credited control measures will provide for attainment of the 24-hour standard by 2006.

Attainment Demonstration Control Measures

We look at four factors to assure that the reductions credited in the attainment demonstration are appropriate and that attainment is demonstrated as expeditiously as practicable.

1. Each measure is approved or proposed for approval into the SIP.

The minimum pre-requisite for crediting a measure into an attainment demonstration is that it is in the SIP or will be made part of the SIP concurrently with the action on the attainment demonstration.

2. Each measure meets basic SIP-enforceability standards.

This factor is really a subset of the previous one since a measure must meet basic enforceability standards before we can approve it into the SIP. The SIP-enforceability standards we are evaluating here are usually described as standards for “practical” enforceability.¹¹⁶ Practical enforceability of a measure is really a question of assuring that the measure is sufficiently explicit in its compliance requirements. In general, practical enforceability is demonstrated for a measure when the measure has:

- a clear statement of applicability, that is, to whom, to what, and when does the measure apply,
- a clear and measurable performance standard, that is, the limit or requirement that must be met and/or what action must be taken is clear and must be capable of being measured, monitored, or otherwise explicitly tracked,
- a specified compliance schedule, that is, the time frames in which the requirements in the measure are to be met are clearly specified,
- a method for measuring/monitoring/tracking the standard.

¹¹⁶ There are actually two distinct standards for “enforceable” that must be met for SIP measures: practical enforceability and legal authority. Legal authority is the assurance that the implementing agency has the legal authority under State and federal law to adopt, implement, and enforce the measure. See CAA section 110(a)(2)(E). We address this legal authority requirement elsewhere in this TSD.

See the *General Preamble* at 13567 and memorandum, J. Craig Potter, "Review of State Implementation Plans and Revisions for Enforceability and Legal Sufficiency," September 23, 1987 (Potter memo) for a further discussion of these enforceability criteria.¹¹⁷

3. The emission reductions credited to each measure are reasonable and consistent with the implementation resources and schedule.

The emission reductions assigned to each measure in the attainment demonstration must be reasonable for the type of control, the source category, and the resources available for implementing and enforcing the measure. The rate at which emission reductions are claimed in an attainment demonstration and reasonable further progress demonstration must reflect the implementation schedule for the measure.

4. The measures must collectively be implemented on the most expeditious schedule practicable.

Section 189(b)(1)(A)(ii) requires if attainment is impracticable by December 31, 2001, that the plan must show attainment by the earliest alternative date practicable. In a plan that includes the feasible BACM and MSM, the principal means of demonstrating expeditious attainment is by implementing the BACM and MSM on an expedited schedule.

The MAG plan divides the adopted control measures into three categories:

1. adopted measures that are quantified for numerical credit in the attainment demonstration
2. adopted measures that are not quantified for numerical credit but are included in the plan to assure the implementation of BACM and MSM
3. adopted measures that are contingency measures.¹¹⁸

¹¹⁷ Most of our guidance regarding SIP enforceability was developed assuming the SIP measure is a rule or regulation. Many of the control measures in the MAG plan are in the form of a commitment by local jurisdiction to take a specific one-time action, like pave a road or synchronize a traffic light. For these types of commitments the SIP enforceability guidance in the Potter memo is overly prescriptive, e.g., a formal test method is not required to determine if a road has been paved. We, therefore, will not apply the specific requirements of the Potter memo to these commitments but instead reference it as a general guide to what makes a SIP measure enforceable.

¹¹⁸ Some BACM and MSM also serve as contingency measures.

Attainment of the 24-hour standard in the MAG plan relies explicitly on reductions from MCESD's Rule 310 and 310.01 and the BMP rule. ADEQ TSD, p. 3-9. These measures are listed and described in Table MOD-1 below.

TABLE MOD-1 CONTROL MEASURES RELIED ON IN THE ATTAINMENT DEMONSTRATION FOR THE 24-HOUR STANDARD					
MEASURE	PERCENT EMISSION REDUCTION 2006	SIP APPROVED OR PROPOSED FOR APPROVAL?	MEET SIP ENFORCEABI- LITY CRITERIA?	EMISSION REDUCTION ESTIMATES REASONABLE?	EXPEDITIOUS IMPLEMENTA- TION?
Rule 310 -- construction	90	Proposed with annual plan	Yes.	Yes	Yes
Rule 310.01 Unpaved roads and alleys	0 ¹¹⁹	Proposed with annual plan	Yes, see annual plan proposal	Yes	Yes
Rule 310.01 Unpaved parking lots	50	Proposed with annual plan	Yes, see annual plan proposal	Yes	Yes
Rule 310.01 Vacant disturbed lots	70	Proposed with annual plan	Yes, see annual plan proposal	Yes	Yes
BMP rule Agricultural fields and aprons	60.3	Proposed on June 29, 2001	Yes, see June 29, 2001 proposal	Yes	Yes, see June 29, 2001 proposal

SIP Enforceability. Table MOD-2 is a summary of how each credited measure meets our SIP enforceability criteria.

¹¹⁹ Controls on unpaved roads are considered a contingency measure for the 24-hour standard and therefore, not credited in the attainment demonstration.

TABLE MOD-2 SIP ENFORCEABILITY CRITERIA				
MEASURE	APPLICABILITY	COMPLIANCE TIME FRAMES	PERFORMANCE STANDARD	MONITORING METHOD
Rule 310 -- construction	See section on proposed approval of MCESD Rule 310 in the TSD supporting the annual standard proposal			
Rule 310.01 Unpaved roads and alleys	See section on proposed approval of MCESD Rule 310.01 in the TSD supporting the annual standard proposal			
Rule 310.01 Unpaved parking lots	See section on proposed approval of MCESD Rule 310.01 in the TSD supporting the annual standard proposal			
Rule 310.01 Vacant disturbed lots	See section on proposed approval of MCESD Rule 310.01 in the TSD supporting the annual standard proposal.			
BMP rule Agricultural fields and aprons	See June 29, 2001 proposed approval of the BMP rule at 66 FR 34598.			

Emission Reduction Estimates. Table MOD-3 list the 2001 and 2006 control factors used by ADEQ in the microscale analysis.

TABLE MOD-3 EMISSION REDUCTION FROM FUGITIVE DUST SOURCES AT WEST CHANDLER AND GILBERT MICROSCALE SITES			
SOURCE (SUB)CATEGORY	CONTROL MEASURE	2001 CONTROL FACTOR PERCENT	2006 CONTROL FACTOR PERCENT
Construction activities - windblown	Rule 310	90	90
Unpaved parking lots	Rule 310.01	0	50
Vacant disturbed lots	Rule 310.01	0	70
Paved roads	various	0	0
Unpaved roads	Rule 310.01	0	0
Agricultural fields	BMP rule	0	60.3
Agricultural aprons	BMP rule	0	60.3

Source: BMP TSD, p. 31.

In performing its microscale analysis, ADEQ first determined that each significant, non-agricultural source at the microscale sites (e.g., the unpaved parking lot at the Gilbert site) was large enough to be subject to Rules 310 or 310.01. For each of these sources, it then applied the control factor used in the Microscale plan for that source. Except for the agricultural sources, ADEQ did not use rule effectiveness factors for either the sources in the microscale component or the sources in the windblown background component in the attainment demonstrations.

Rule effectiveness (RE) accounts for emission reductions lost because of noncompliance, control equipment downtime, failure to apply adequate controls, or failure to use control equipment properly. One hundred percent rule effectiveness is the ability of a regulatory program to achieve all the emission reductions that could be achieved by full compliance with the applicable regulations at all sources at all times. Because RE factors are intended to reflect the variations in compliance among large numbers of sources, they are applied to *source categories* rather than to individual sources.

We agree that it is appropriate not to apply an RE factor to the individual sources at each microscale site;¹²⁰ however, we believe that an RE factor should be applied to the windblown background source categories because each category represents multiple sources. However, as we discuss later, we find that the plan still demonstrates attainment of the 24-hour standard when appropriate RE factors are applied to the windblown background component.

In its modeling for 2001, ADEQ assumed controls only on the “permitted” sources, that is, only on those sources that receive permits from MCESD. ADEQ assumed that all the “nonpermitted” sources--unpaved roads, vacant lots, and unpaved parking lots--are uncontrolled in 2001. This latter assumption does not reflect the efforts by MCESD to assure the implementation of BACM on these sources by 2001. However, incorporating appropriate control factors into the modeling for 2001 only decreases the projected air quality levels at each site in 2001 and does not affect the plan’s conclusions that each site will attain by no later than 2006.

Overall, we find that the emission reduction estimates for each source category are consistent with research on the applicable control methods and are appropriately applied in the attainment demonstrations. For more information on the quantification of emission reductions from the agricultural BMP general permit rule, see the section “Implementation of BACM and Inclusion of MSM for Agricultural Sources” in this TSD.

Expeditious Implementation. Overall, we believe that the MAG plan provides for expeditious implementation. See Table MOD-4.

¹²⁰ At each microscale site, there is only a single source in each category, that is there is a single vacant lot, a single construction site, a single agricultural field with its apron, a single unpaved parking lot.

TABLE MOD-4 EXPEDITIOUS IMPLEMENTATION	
MEASURE	DISCUSSION
Rule 310	Rule adopted, compliance required prior to June 10, 2000, the BACM implementation deadline for the Phoenix area. Maricopa County's commitments to increase source education and enforcement are all scheduled for completion this year. Maricopa County commitments, 1999 Revised Measure 6. We propose to find that implementation of the control program is expeditious. The MAG plan assumes that emission reductions from improving the fugitive dust control program ramp up over time due to improvements in compliance rates and control effectiveness. Both these are related to source education and the effect of increased enforcement modifying source behavior. Education and changes in behavior take time to effect; therefore, we believe that the emission reductions are being achieved expeditiously.
Unpaved roads and alleys (Rule 310.01)	For public roads, 250 ATD roads by 6/10/00, 150 ATD roads by 6/10/04 (Rule 310.01, section 304). Given the cost of paving and treating roads and the fact that funds for doing so only become available over several years, we propose to find that this schedule is expeditious.
Unpaved parking lots (Rule 310.01)	Rule adopted, compliance required prior to June 10, 2000.
Vacant disturbed lots (Rule 310.01)	Rule adopted, compliance required prior to June 10, 2000
Agricultural fields and aprons	Rule adopted, compliance required by December 31, 2001. AAC R18-2-611. See discussion in the section "Implementation of BACM and Inclusion of MSM for Agricultural Sources" and June 29, 2001 proposal for an explanation on why we consider this expeditious.

Conclusion. Based on the analysis above and the additional analysis below, we propose to find the MAG plan's conclusions that attainment of the 24-hour standard is demonstrated by 2006 and that this date is the most expeditious date practicable are correct

As noted before, the assumptions made on overall control effectiveness are not consistent between the annual standard attainment demonstration and this demonstration for the 24-hour standard. Also, in its attainment demonstration, ADEQ did not incorporate a rule effectiveness factor in calculating the contribution from windblown background.

We recalculated the 2006 impacts at each monitor to determine if using consistent assumptions between the annual standard and 24-hour standard demonstrations and incorporating a RE factor into the windblown background would affect the plan's demonstration of attainment by December 31, 2006. Tables Imp-3 and Imp-4 show the results of these recalculations.

TABLE MOD-5 REVISED ATTAINMENT DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH ANNUAL STANDARD DEMONSTRATION WEST CHANDLER				
SOURCE	CONTROL	1995 IMPACT MG/M ³	2006	
			CONTROL	IMPACT MG/M ³
Ag fields	BMP rule	190	60.3	75.4
Ag aprons	BMP rule	24	60.3	9.5
Road construction	Rule 310	73.5	87.5	9.2
Housing construction	Rule 310	0.1	87.5	0
Vacant lands	Rule 310.01	29.3	88.7	3.3
Paved Roads	--	0.2	0	0.2
Unpaved Roads	Rule 310.01	4.1	0 ¹	4.1
Total local impact		321.2		101.7
Background - wind blown		58.2		20.5
Background - nonwind		21.8		21.8
Total		401.2		144.0

Footnote: 1. Controls on unpaved roads are considered contingency measure and therefore not credited in the attainment demonstration.

Source: 1995 impacts, ADEQ TSD, pp. 3-10 and 3-12. Control efficiencies, see Table MOD-7.

Source: Land use percentages and wind contributions - 9 hrs, ADEQ TSD, p. A-8. Overall control efficiencies, see Table MOD-7.

TABLE MOD-5A CONTRIBUTIONS TO WINDBLOWN BACKGROUND WITH REVISED CONTROL FACTORS WEST CHANDLER, 2006			
	AGRICULTURE	CONSTRUCTION	VACANT LOTS
Land use percentage	56%	39%	5%
Wind contribution 9 hrs	32.6 $\mu\text{g}/\text{m}^3$	22.7 $\mu\text{g}/\text{m}^3$	2.9 $\mu\text{g}/\text{m}^3$
Overall control efficiency	60.3%	70%	71%
PM10 Contribution with controls	12.9 $\mu\text{g}/\text{m}^3$	6.8 $\mu\text{g}/\text{m}^3$	0.8 $\mu\text{g}/\text{m}^3$
total windblown background = 20.5 $\mu\text{g}/\text{m}^3$			

Source: Land use percentages and wind contributions - 9 hrs, ADEQ TSD, p. A-7. Overall control efficiencies, see Table MOD-7.

TABLE MOD-6 REVISED ATTAINMENT DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH ANNUAL STANDARD DEMONSTRATION GILBERT				
SOURCE	CONTROL MEASURE	1995 IMPACT MG/M ³	2006	
			CONTROL %	IMPACT MG/M ³
Ag aprons	BMP rule	55	60.8	21.8
Unpaved parking lots	Rule 310	67.2	87.9	8.1
Vacant lands	Rule 310.01	13.5	88.7	1.5
Paved Roads	--	1.5	0	0.2
Unpaved Roads	Rule 310.01	3.5	0 ¹	3.5
Total local impact		139.4		32

TABLE MOD-6 REVISED ATTAINMENT DEMONSTRATION USING CONTROL FACTORS CONSISTENT WITH ANNUAL STANDARD DEMONSTRATION GILBERT				
SOURCE	CONTROL MEASURE	1995 IMPACT MG/M ³	2006	
			CONTROL %	IMPACT MG/M ³
Background - wind blown		68.2		24.1
Background - nonwind		21.8		21.8
Total		229.7		77.9

Footnote: 1. Controls on unpaved roads are considered contingency measure and therefore not credited in the attainment demonstration.

Source: 1995 impacts, ADEQ TSD, pp. 3-11 and 3-13. Control efficiencies, see Table MOD-7.

Source: Land use percentages and wind contributions - 7 hrs, ADEQ TSD, p. A-7. Overall control efficiencies, see Table MOD-7.

TABLE MOD-6A CONTRIBUTIONS TO WINDBLOWN BACKGROUND WITH REVISED CONTROL FACTORS GILBERT 2006			
	AGRICULTURE	CONSTRUCTION	VACANT LOTS
Land use percentage	55%	41%	4%
Wind contribution 9 hrs	37.5 µg/m ³	28.0 µg/m ³	2.7 µg/m ³
Overall control efficiency	60.3%	70%	71%
PM10 Contribution with controls	14.9 µg/m ³	8.4 µg/m ³	0.8 µg/m ³
total windblown background = 24.1 µg/m ³			

Source: Land use percentages and wind contributions - 7 hrs, ADEQ TSD, p. A-8. Overall control efficiencies, see Table MOD-7 of this TSD.

TABLE MOD-7 CONTROL AND RULE EFFECTIVENESS ASSUMPTIONS FOR FUGITIVE DUST SOURCES FROM ANNUAL STANDARD DEMONSTRATION (EXCEPT FOR AGRICULTURAL SOURCES)							
SOURCE (SUB)CATEGORY	CONTROL MEASURE	2001			2006		
		CF	RE	OVERALL CONTROL EFFECT	CF	RE	OVERALL CONTROL EFFECT
Disturbed area on construction sites	Rule 310	[77]	[71.3]	[54.9]	[87.5]	80	70
Unpaved roads (microscale only)	Rule 310.01	75.0	71.3	29.9	75.0	80	60
Unpaved parking lots - windblown dust	Rule 310.01	[88.7]	71.3	[35.4] ²	88.7	80	71
Vacant disturbed lots	Rule 310.01	[88.7]	71.3	[53.1] ³	88.7	80	71
Agricultural aprons and fields	BMP rule	[34] ⁴	[80] ⁵	[31.2]	--	--	60.3

Values in brackets have been calculated by EPA from information available in the MAG plan.

Table Footnotes:

1. Control effectiveness calculated assuming multiple control methods
2. Also incorporates a rule penetration factor of 56 percent.
3. Only 84 percent of vacant lots are assumed to be subject to control in 2001.
4. Factor includes 20 percent decline in agricultural land between 1995 and 2001 and minimum level BMP implementation. The 20 percent is calculated as 6/11 of the 37 percent loss between 1995 and 2006. 6 being the number of years between 1995 and 2001 and 11 being the number between 1995 and 2006. 37 percent figure is from BMP TSD, p. 9. BMP control factor is calculate from information in the BMP Quantification TSD, table 4-2 and assumes minimum control levels from the BMP.

Source: MAG TSD, Appendix IV, Exhibit 1, documentation for Measures 1, 3, 4, and 5. Ag information: BMP Quantification TSD, Table 4-2.

As can be seen from Table MOD-5, 24-hour PM-10 levels at the West Chandler site will be below the standard by 2006.¹²¹ Using figures from Tables IMP-3 and DEM-5, it is also clear

¹²¹ The closeness of the attainment demonstration here is in part due to the conservative assumption that nonwind background concentrations remain constant from 1995 to 2006 despite the controls being placed on the sources that make up this component of the background.

that earliest attainment will occur at the West Chandler site is 2006. From 2001 to 2006, the MAG plan assumes that the control measures steadily become more effective as sources become more experienced at implementing them and compliance programs ramp up. Given this steady improvement in control levels, ambient concentrations should steadily decrease from 2001 to 2006, with roughly the same reduction in concentration each year. This annual decrease in ambient concentrations is $13.6 \mu\text{g}/\text{m}^3$ (the difference between the 2001 total concentration of $212 \mu\text{g}/\text{m}^3$ and the 2006 concentration of $144.0 \mu\text{g}/\text{m}^3$ divided by 5 years). Adding this value to the 2006 level of $144.0 \mu\text{g}/\text{m}^3$, we get an estimated 2005 ambient levels of $157.6 \mu\text{g}/\text{m}^3$, still well above the standard of $150 \mu\text{g}/\text{m}^3$.

However, our previous recalculations show that attainment of the 24-hour standard at the Gilbert site is practicable by 2001. See Table IMP-4. The site's primary source--an unpaved parking lot--is subject to full control under Rule 310.01 by 2001 and controls on this source together with controls on vacant lands, also required by Rule 310.01, result in the site showing attainment by 2001.

In order to show attainment, a plan must show attainment at each location within the nonattainment area; thus an area's attainment date is the date the last location within the nonattainment area attains. Because the West Chandler site does not attain the 24-hour standard until December 31, 2006, this date becomes the 24-hour PM-10 standard attainment date for the entire Phoenix nonattainment area.

Our recalculation shows that the MAG plan's conclusions that the Phoenix area will attain the 24-hour PM-10 standard by 2006 is correct.

This section prepared by Scott Bohning and Frances Wicher

EXTENSION REQUEST – OTHER FACTORS THAT EPA MAY CONSIDER IN GRANTING AN EXTENSION REQUEST

Requirement: CAA section 188(e) allows states to apply for an extension. We may grant the extension if certain criteria are met. We may also consider a number of other factors in determining whether to grant an extension and the length of that extension.

Proposed Action: Not applicable.

**Primary
Guidance
Documents:** None

**Primary
Plan Cites:** Chapter 10

What are the statutory requirements?

Section 188(e) states that in determining whether to grant an extension and the appropriate length of the attainment date extension we may consider:

1. the nature and extent of the nonattainment problem,
2. the types and numbers of sources or other emitting activities in the area (including the influence of uncontrollable natural sources and international transport),
3. the population exposed to concentrations in excess of the standard,
4. the presence and concentration of potentially toxic substances in the mix of particulate emissions in the area, and
5. the technological and economic feasibility of various control measures.

The Act does not require us to consider any or all of these factors in deciding the length of the extension request.

How are these requirements addressed in the plan?

The MAG plan provides information addressing each of the factors in Chapter 10 (pp. 10-47 to 10-48).

Does the plan meet the statutory requirements?

We discuss how the MAG plan addresses each of the five factors that we may take into account when determining whether to grant an extension and how long that extension should be in Table FAC-1.

We have already proposed to determine that the MAG plan provides for both BACM and MSM and for attainment of the 24-hour PM-10 standard by the earliest practicable date of December 31, 2006. Nothing in the additional information presented on the five factors suggest that granting an 5-year extension of the attainment date for the Phoenix area is inappropriate.

TABLE FAC-1 OTHER FACTORS EPA MAY CONSIDER IN GRANTING AN EXTENSION AND THE LENGTH OF THE EXTENSION FOR THE 24-HOUR STANDARD	
OTHER FACTORS	DISCUSSION
Nature and extent of nonattainment	Elevated 24-hour levels of PM-10 occur mainly in areas with large fugitive dust sources or a concentration of fugitive dust sources. Areas such as this can be found throughout the Phoenix nonattainment area, so we would expect that there are elevated 24-hour PM-10 levels throughout the Phoenix area. As a result, in order to attain the 24-hour standard, controls need to be uniformly implemented throughout the area, a task that generally requires longer to achieve than implementing controls in few localized areas.
Types and numbers of sources or other emitting activities	Primary contributors to elevated PM-10 levels are fugitive dust sources including unpaved roads, construction activities, disturbed vacant lands, unpaved parking lots, and agricultural sources. MAG plan, p. 10-51. These sources are ubiquitous in the nonattainment area and collectively number in the thousands. (For example, MCESD issued 2500 construction permits in 1999; we mailed 50,000 letters to owners of vacant lots in the nonattainment area.)
Population exposure to concentrations	The MAG plan estimates population exposure to elevated levels of PM-10 (both annual and 24-hr) to be from 78,000 to be 163,000 (1995 figure), p. 10-13. This population exposure is calculated using estimates

TABLE FAC-1 OTHER FACTORS EPA MAY CONSIDER IN GRANTING AN EXTENSION AND THE LENGTH OF THE EXTENSION FOR THE 24-HOUR STANDARD	
OTHER FACTORS	DISCUSSION
above the standard	of disturbed land versus population in subareas of the nonattainment area. According to this calculation, 84% of Maricopa's population lives in areas where 10 or less percent of the land is open. MAG plan, Table 10-13. The plan provide for implementation of BACM on disturbed land (including construction) with much of the emission reductions being achieved early, all these factors will reduce population exposure as quickly as practicable.
Presence and concentration of potentially toxic substances in the particulate	Primary source of airborne cancer risk in the Maricopa area is internal combustion engine exhaust from both on and off-road engines. This risk is from all pollutants emitted from these sources (gaseous and particulate). MAG plan, p. 10-61 based on an ADEQ study. The MAG plan concludes that the cancer risk in the Phoenix area is comparable to those in California cities, p. 10-61. The MAG plan and other Arizona programs (e.g., cleaner burning gasoline, national emission standards for off-road engines) target emissions from on and off road engines. Almost all of the PM-10 emission reductions in the out years of the plan (2003 and later) are and need to be from fugitive dust sources and not from on and off road engines; therefore extending the attainment date does affect the degree of public exposure to the major source of toxic risk. In other words, shortening the extension would not reduce the public's exposure to the major source of toxic risk, on and off road engines.
Technological and economic feasibility of controls	Fugitive dust sources dominate the emissions inventory in the Maricopa nonattainment area. Controls for these sources are well known (paving, wetting surfaces, etc.) and have been adopted; however, the number of sources and nature of sources make education and outreach necessary to assure full compliance with those controls. In addition, costs for paving roads, purchasing street sweepers, and other capital improvements necessary to reduce PM-10 emissions are high and necessary funds are only available over a number of years. These factors generally support a longer timeframe for attainment.

This section prepared by Frances Wicher

SUMMARY OF PROPOSED FINDINGS ON ARIZONA'S EXTENSION REQUEST

Based our review of the MAG plan and our proposed determination that it meets the five requirements necessary for granting an extension of the attainment date under CAA section 188(e), we are proposing to grant an five-year extension of the date for attainment of the 24-hour PM-10 standard in the Phoenix PM-10 serious area nonattainment area from December 31, 2001 to December 31, 2006.

TABLE EXT -1	
SUMMARY OF OUR FINDING ON ATTAINMENT DATE EXTENSION CRITERIA	
EXTENSION CRITERIA	PROPOSED CONCLUSION
Applied for the extension request?	The extension request was subject to public comment during hearings on the overall Plan.
Demonstrated the impracticability of attaining the annual standard by December 31, 2001?	Despite the application of BACM, 24-hour PM-10 levels will remain above the standard after 12/31/01 making attainment impracticable.
Comply with all requirements and commitments pertaining to the area in the implementation Plan?	Agencies have complied with their commitments in the Moderate PM-10 Plan.
Demonstrated to our satisfaction that the plan includes the most stringent measures?	We propose to find that the MAG plan includes to our satisfaction the most stringent measures applicable to the area.
Submitted a demonstration that the attainment will occur by the most expeditious alternative date practicable?	The MAG plan shows that attainment by December 31, 2006 is the most expeditious date practicable given the level of emission reductions needed and the sources from which those reductions must come.

REASONABLE FURTHER PROGRESS AND QUANTITATIVE MILESTONES

Requirement: CAA section 172(c)(2): annual incremental reductions in emissions as may be required by EPA for ensuring attainment of the PM-10 standard by the applicable date.
CAA section 189(c)(1): quantitative milestones to be achieved every 3 years until the area is redesignated to attainment.

Proposed Action: Approve

Primary *General Preamble*, p. 13539
Guidance *Addendum*, pp. 42015-42016
Documents:

Primary MAG plan, pp. 8-20 to 8-22
Plan Cites: BMP TSD, pp. 29-31

What are the statutory and policy requirements?

CAA section 172(c)(2) requires nonattainment plans to provide for reasonable further progress (RFP). Section 171(1) of the Act defines RFP as “such annual incremental reductions in emissions of the relevant air pollutant as are required by this part [part D of title I] or may reasonable be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date.”

Historically, RFP has been met by showing annual incremental emission reductions sufficient generally to maintain at least linear progress toward attainment by the applicable deadline. Requiring linear progress in PM-10 plans is more appropriate in situations where:

- PM-10 is emitted by a large number and diverse sources,
- the relationship between any individual source or source category and overall air quality is not well known,
- secondary particulate significantly contributes to overall PM-10 levels, and/or
- the emission reductions needed for attainment are inventory-wide.

Addendum at 42015.

In general, serious area PM-10 plans should include detailed schedules for compliance with emission regulations in the area and accurately indicate the corresponding annual emission reductions to be realized from each milestone in the schedule. We have considerable discretion in reviewing the PM-10 plan to determine whether the annual incremental emission reductions to be achieved are reasonable in light of the statutory objective of timely attainment. We believe

that it is appropriate to require early implementation of the most cost-effective control measures while phasing in the more expensive control measures. *Addendum* at 42016.

CAA section 189(c) also requires PM-10 plans demonstrating attainment to contain quantitative milestones which are to be achieved every 3 years until the area is redesignated attainment and which demonstrate RFP. These quantitative milestones should consist of elements that allow progress to be quantified or measured. *Addendum* at 42016.

The Act does not specify which year is to be the starting point for the 3-year milestone. In the *General Preamble*, we determined that for the initial moderate areas, PM-10 plans demonstrating attainment should address at least two milestones and that the starting point for the first 3-year period should be the original moderate area PM-10 plan submittal due date of November 15, 1991, making the first milestone date 3 years later, i.e., the moderate area attainment date of December 31, 1994¹²² and the second one, December 31, 1997, 3 years after the first. *General Preamble* at 13539, *Addendum* at 42016. For moderate areas that are reclassified as serious, the third milestone achievement date is November 15, 2000. *Addendum* at 42016.

How are these requirements addressed in the plan?

In order to demonstrate RFP for the 24-hour standard, the plan first regionalizes the inventories at the two microscale sites by multiplying emissions from each source by a factor of 360, which is the ratio of the size of the nonattainment area (2,880 square miles) to the size of the microscale sites (8 square miles). It then calculates the emission reductions from the application of the adopted measure to these sources. Next, it annualizes these emission reductions by multiplying the sources--which are all windblown sources--by 11, the number of windy days in 1995. Finally, the annualized figure is divided by 365 days to get an average annual day emission reductions. The annual RFP rate is the 2006 average annual day emission reduction divided by 5, the number of years between 2001 and 2006. See BMP TSD, pp. 29 - 31.

The BMP TSD presents the RFP calculation in a table on p. 31. There is an error in this table. In the Microscale plan, the inventories are in kg/day. One kilogram equals 2.2 lbs; however, in converting from kgs to lbs for the RFP table, the microscale inventory was divided by 2.2 instead of multiplied by 2.2. ADEQ corrected this error in a letter to us. See letter, Jacqueline Schafer, ADEQ to Laura Yoshii, "Addendum to June 13, 2001, Submittal of State Implementation Plan revision for the Agricultural Best Management Practices program in the

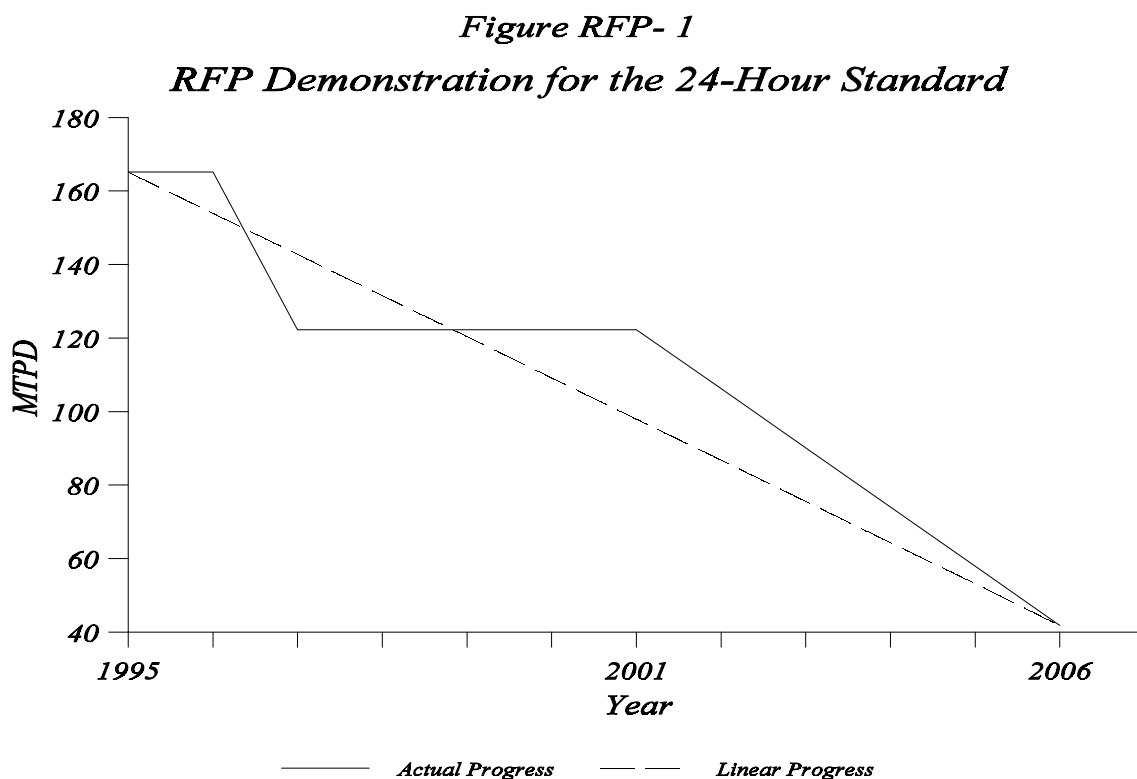
¹²² The exact milestone date would be November 15, 1994; however, given the relatively small amount of time between this date and the attainment date of December 31, 1994, we believed it appropriate and efficient to make the milestone coincide with the attainment date. *General Preamble* at 13539.

Maricopa County PM₁₀ Nonattainment Area,” September 7, 2001. (ADEQ RFP Letter) We show the corrected RFP demonstration in Table RFP-1.

The plan does not provide specific milestones for the 24-hour standard although such milestones are easily calculated using information in the plan and the same general assumption, control levels steadily increase from 2001 to 2006, underlying the milestones for the annual standard. See Table RFP-2.

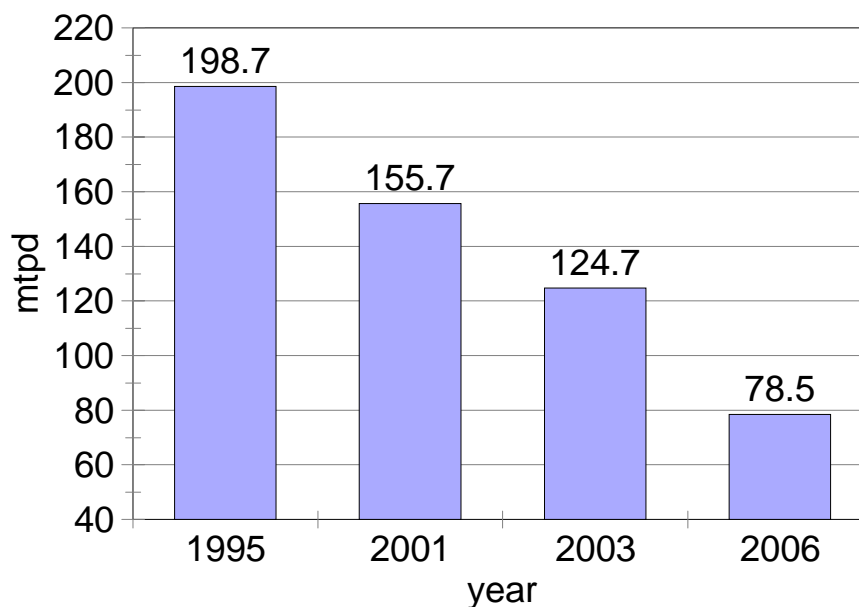
TABLE RFP-1 REVISED RFP DEMONSTRATIONS FOR THE 24-HOUR STANDARD 1995 TO 2006									
SOURCE	24-HR MICROSCALE EMISSIONS INVENTORY 1995 (LB/DAY)	REGIONAL FACTOR	24-HOUR REGIONAL EMISSIONS (MTPD)	PERCENT EMISSION REDUCTION 2006	ESTIMATED DAILY EMISSION REDUCTION MTPD	ANNUAL FACTOR (DAYS PER YEAR)	ESTIMATED ANNUAL EMISSION REDUCTIONS 2006 (MTPY)	DAYS PER YEAR	ESTIMATED DAILY EMISSION REDUCTION 2006 (MTPD)
[Road] Construction	9,673	360	1,583	90	1,425	11	15,671	365	42.9
Vacant lands	13,781	360	2,255	70	1,579	11	17,364	365	47.6
Unpaved parking lots	418	360	68	50	34	11	376	365	1.0
Agriculture	--	--	1,575	60.3	950	11	10,447	365	28.6
Total			5,481						120.5
Total Reduction 1995-2006									120.1
Annual RFP Rate = Total reduction 1995-2006/11 years (mtpd per year)									10.9

Source: ADEQ RFP Letter, Enclosure 1.



ADEQ also provide milestones in its September 7, 2001 RFP letter. It estimated quantitative milestones for 2001, 2003, and 2006 for the 24-hour standard using the design day (April 9, 1995) emissions and control efficiencies (90 percent for road construction; 70 percent for vacant land, and 50 percent for unpaved parking lots) used in the 24-hour plan attainment demonstration. It also used the agricultural inventory and associated reductions detailed in the Ag Quantification TSD. The projected daily milestones for 2001, 2003, and 2006 are 156, 125, and 79 metric tons per day, respectively. ADEQ RFP Letter, Enclosure 2. The milestones are shown in Figure RFP-2. The 120 metric ton per day reduction in emissions from 1995 to 2006 satisfies the RFP requirement.

Figure RFP-2
Milestones for the 24-hour Standard



Does the plan meet our policy requirements?

We propose to find that the MAG plan provides for RFP and meets the milestone requirements of the Act for the 24-hour PM-10 standard.

Reasonable Further Progress

The MAG plan provides for annual progress toward attaining the 24-hour standard. See Figure RFP-1 above. This demonstration shows that most of the projected reductions occur after 2001; however, this is an artifact of the assumption that there are no controls on agricultural sources, vacant lots and unpaved parking before December 31, 2001. This assumption does not reflect the efforts by MCESD to assure the implementation of BACM on these sources and the requirement for BMPs in the general permit to be implemented by then.

As noted above, a demonstration of linear progress is most suitable under certain conditions such as 1) PM-10 is emitted by a large number of diverse sources, 2) the relationship between any individual source or source category and overall air quality is not well known, 3) secondary particulate significantly contributes to overall PM-10 levels, and/or 4) the emission reductions needed for attainment are inventory-wide. None of these conditions is met in the attaining the 24-hour standard in the Phoenix area because attainment is depended on controls on just a few types of fugitive dust sources: construction, unpaved roads, unpaved

parking, vacant lots, and agricultural sources. Therefore, strict linear progress is not necessary to show reasonable further progress towards attainment in the Phoenix area.

The plan does not provide emission reduction information for each year between the base modeling year of 1995 and the attainment year of 2006. We do not believe that this level of detail is necessary or meaningful given the evidence that progress is being over time and the implementation of controls are not being delayed. See Figure RFP-1. Therefore, we propose to find that the MAG plan provides for “such annual incremental reductions in emissions of the relevant air pollutant as are required by this part [part D of title I] or may reasonably be required by the Administrator for the purpose of ensuring attainment of the [24-hour PM-10] national ambient air quality standard by the applicable date” as required by section 172(c)(2) of the Act.

Quantitative Milestones

Milestones are intended as checks along the way, a means of judging actual emission reductions and control measure implementation against those projected in the plan. Arguable, given the microscale analysis that is the bases for the Phoenix area’s 24-hour standard plan, quantitative milestones should be established for both the West Chandler and Gilbert sites. However, this approach would actually defeat the purpose of the quantitative milestones rather than fulfill it.

In order to report on a quantitative milestone at the microscale sites, Arizona would need to evaluate the implementation of controls at each site. However, land uses and activities around each of these microscale sites have changed significantly since 1995. For example, at the West Chandler site, the road construction has been completed and the agricultural field and its apron have been converted into stores. Thus, reporting on each site’s quantitative milestones would tell us more about the land use changes around each site than about the implementation of controls. Because of this, the quantitative milestones for the 24-hour plan need to reflect more regional implementation of controls. ADEQ’s approach of regionalizing and annualizing the emissions inventories from the microscale sites and then basing its RFP demonstration and milestones on the resulting inventory is an appropriate way to deal with these requirements for the 24-hour standard.

Our guidance provides for a quantitative milestone for the year 2000. *Addendum* at 42016. Based on the statutory requirement for milestones every three years, the years 2003 and 2006 are the next two milestones for areas with an attainment date extension under section 188(e). The MAG plan provides milestones for 2003 and 2006 but substitutes 2001 for 2000. We believe this minor deviation from our guidance is appropriate and acceptable for the following reasons. See Figure RFP-2.

First, we set the milestone schedule in our serious PM-10 area guidance assuming the area involved was one of the initial moderate areas and its moderate area plan demonstrates

attainment by December 31, 1994.¹²³ *General Preamble* at 13539 and *Addendum* at 42016. Although the Phoenix area was one of the initial moderate nonattainment areas, its moderate area plan did not demonstrate attainment.¹²⁴ As a result, our guidance on the appropriate milestone years is not strictly applicable to the MAG serious area plan.

Second, we note that our guidance in the *General Preamble* and *Addendum* is just that, guidance. We never intended that it be applied invariably every situation without regard to the actual facts of the nonattainment area and problem under consideration. We make this plain at the beginning of *General Preamble*:

This General Preamble principally describes EPA's preliminary views on how EPA should interpret various provisions of title I Although the General Preamble includes various statements that States must take certain actions, these statements are made pursuant to EPA's preliminary interpretations and thus do not bind the States and the public as a matter of law.

and

While this preamble should reflect the majority of the SIP requirements under title I, unique circumstances or as yet unrecognized issues are likely to cause case-by-case exception to arise.

General Preamble at 13498 and 13499. See also *Addendum* at 41999.

Thus, we cannot apply guidance absent due consideration of whether it reflects the best interpretation of the statutory requirement in a given situation.

Finally, we believe that the statutory purpose for including milestones in PM-10 plans is best served in the Phoenix area by having the milestone year be 2001 rather than 2000. Under the Act, states are to submit a demonstration 90 days after a milestone date that the state has

¹²³ This is made clear by understanding two facts. First, only the initial moderate areas, those designated nonattainment by operation of law on November 15, 1990, had moderate area plans due by November 15, 1991 and moderate attainment dates of December 31, 1994. See CAA section 189(a)(2)(A). Second, section 189(c) only requires quantitative milestones in plans demonstrating attainment.

¹²⁴ The moderate area plan submitted by the State in 1991 and revised in 1993 and 1994 demonstrated the impracticability of attainment by December 31, 1994. While we have subsequently disapproved this impracticability demonstration because the plan did not include RACM, we confirmed that attainment was indeed impracticable in our 1998 FIP. See 63 FR 41326, 41340.

implemented all measures in its approved plan and has met the milestone. See CAA section 189(c)(2). If a state fails to submit a report or we determine that the area has not met a milestone, then the state must submit a plan revision that assures that the next milestone will be met. See CAA section 189(c)(3).

It is clear from the statutory requirements, that the milestone requirement functions as a mid-course evaluation of the PM-10 plan and an opportunity to make corrections to the plan to assure that there is no delay in attainment due to failures to implement or achieve needed reductions. As such, the milestones should be keyed, to the extent possible, to major implementation deadlines in a manner that allows for a realistic and comprehensive look at the effectiveness of implemented measures.

The BACM implementation deadline for Phoenix is June 10, 2000. A December 31, 2000 milestone allows for the evaluation of only a half-year of implementation, which is little time to see if implementation is going to achieve the expected emission reductions. Setting the milestone one year later on December 31, 2001 as the MAG plan does, provides for a full year of implementation and allows for a more real assessment of the effectiveness of BACM yet still leaves ample time to make any corrections needed to assure timely attainment. Therefore, we believe that strict adherence to the 2000 milestone date in our guidance would be less beneficial to attainment in the Phoenix area than setting the date at 2001.

The next milestone in the MAG plan after the 2001 one is in 2003. MAG plan, Figure 8-4. This second milestone is only 2 years after the first, instead of 3 years arguably required by the Act. However, we believe that the 3-year milestone increment in CAA section 189(c) is the maximum allowable time between milestones and nothing in the section prohibits states from setting milestones dates that are closer together.

For these reasons, we propose to find that the MAG plan meets the quantitative milestone requirement in CAA section 189(c)(1) for the 24-hour standard.

RFP Demonstration Based on Annual Standard Assumptions

As noted previously, ADEQ assumed controls only on the “permitted” sources, that is, only on those sources that receive permits from MCESD, in its modeling of the microscale sites in 2001. ADEQ assumed that all the “nonpermitted” sources--unpaved roads, vacant lots, and unpaved parking lots--are uncontrolled in 2001. ADEQ TSD, pp. 3-10 and 3-1. This latter assumption does not reflect the efforts by MCESD to assure the implementation of BACM on these sources and is inconsistent with the assumptions made for these sources in the annual standard impracticability demonstration. In fact, in most instances, the assumptions made on overall control effectiveness are not consistent between the 24-hour standard impracticability and attainment demonstrations and those demonstrations for the annual standard.

ADEQ also assumed that there would be no control on agricultural sources in 2001. This is inconsistent with the implementation schedule for the BMP rule which requires compliance by December 31, 2001 and the 20 percent loss of agricultural land between 1995 and 2001.

To determine if the plan would still show RFP with the use of consistent assumptions between the annual standard and 24-hour standard demonstrations, we recalculated the RFP demonstration using the control assumptions from the annual standard demonstrations and additional control information from the BMP TSD. Because we are dealing with region-wide controls, we assumed a 80 percent rule effectiveness factor for each controlled source. Table RFP-3 and Figure RFP-3 show the results of these recalculations.

TABLE RFP-3 RFP FOR THE 24-HOUR STANDARD USING ANNUAL STANDARD ASSUMPTIONS							
	CONSTRUC- TION	UNPAVED PARKING	VACANT LANDS	AGRICUL- TURE	UNPAVED ROADS ²	PAVED ROADS	TOTAL
1995 Microscale Emissions (kg/day)	4,394	190	6,264	--	51	42	--
Regional Factor	360	360	360	--	360	360	
1995 Regionalize Microscale Emissions (mtpd)	1,582	68	2,255	1,575	18	15	5,514
Annual factor days per year	11	11	11	11	365	365	
1995 Regionalized Microscale Emissions (mtpy)	17,400	752	24,805	17,325	6,701	5,519	72,503
1995 Regionalized Microscale Emissions (mtpd)	47.7	2.1	68.0	47.5	18.4	15.1	198.6
2001 Control Level Percent	54.9	35.4	53.1	20.0/31.2	0.0	0.0	

TABLE RFP-3 RFP FOR THE 24-HOUR STANDARD USING ANNUAL STANDARD ASSUMPTIONS							
	CONSTRUC- TION	UNPAVED PARKING	VACANT LANDS	AGRICUL- TURE	UNPAVED ROADS ²	PAVED ROADS	TOTAL
2001 Regionalized Microscale Emissions (mtpd)	21.5	1.3	31.9	38.0/32.7	18.4	15.1	126.2/ 120.8
2006 Control Level Percent	70.0	71.0	71.0	60.3	0.0	0.0	
2006 Regionalized Microscale Emissions (mtpd)	14.3	0.6	19.7	18.8	18.4	15.1	86.9

Source: BMP TSD, p. 31, Table MOD-7.

Footnote:

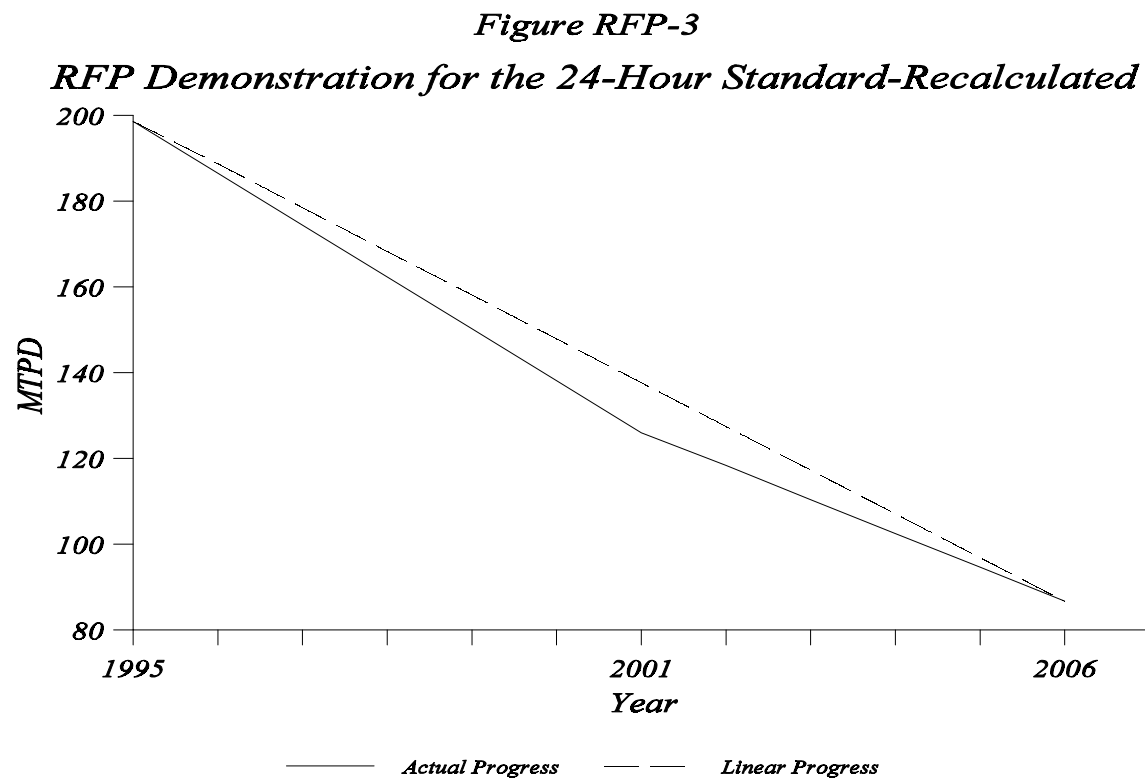
1. Calculated as $(1 - 2001/03/06 \text{ control level}/100) \times 1995 \text{ regionalized microscale inventory in mtpd}$
2. No control is assumed on unpaved roads because controls on this source are used as contingency measures for the 24-hour standard and thus cannot be credited into an RFP demonstration.

1995 to 2006 RFP Rate: 10.2 mtpd per year

1995 to 2001 RFP Rate: 12.1 mtpd per year (20% ag control)/13.0 mtpd per year (31.2% ag control)

2001 to 2006 RFP Rate: 7.9 mtpd per year (20% ag control)/6.8 mtpd per year (31.2% ag control)

This recalculation shows that the plan does provide for RFP and that the MAG plan's conclusions regarding RFP are correct.



CONTINGENCY MEASURES

Requirement: Section 172(c)(9) of the Clean Air Act requires that implementation plan provide for contingency measures to be undertaken if the area fails to make RFP or attain.

Proposed Action: Approve

Primary Guidance Documents: *Addendum*, pp. 42014-42015
Memorandum, G.T. Helms, Chief, Ozone/Carbon Monoxide Programs Branch, OAQPS to Air Branch Chiefs, Regions I-X, "Early Implementation of Contingency Measures for Ozone and Carbon Monoxide (CO) Nonattainment Areas," August 13, 1993

Primary Plan Cites: MAG plan, pp. 8-16 to 8-18.
BMP TSD, pp. 29 - 31 and ADEQ RFP Letter, Enclosure 1.

What are the statutory, regulatory, and policy requirements?

Section 172(c)(9) of the Clean Air Act requires that implementation plans provide for the implementation of specific measures to be undertaken if the area fails to make RFP or attain by its attainment deadline. These contingency measures are to take effect without further action by the State or the Administrator. The Act does not specify how many contingency measures are necessary nor does it specify the level of emission reductions they must produce.

We interpret the "take effect without further action by the State or the Administrator" to mean that no further rulemaking actions by the State or EPA would be needed to implement the contingency measures. *Addendum* at 42015.

The purpose of contingency measures is to ensure that additional emission reductions beyond those relied on in the attainment and RFP demonstrations are available if there is a failure to make RFP or attain by the applicable attainment date. These additional emission reductions will assure continued progress towards attainment while the SIP is being revised to fully correct the failure. To ensure this continued progress, we recommend that contingency measures provide emission reductions equivalent to one year's average increment of RFP. *Addendum* at 42016.

Certain core control measure requirements such as RACM, BACM, and MSM may result in a state adopting and expeditiously implementing more measures than are strictly necessary for expeditious attainment and/or RFP. Because of this and because these core requirements effectively require the implementation of all non-trivial measures that are technologically and

economically feasible for the area, states are left with few, if any, substantive unimplemented control measures. In fact, under the Act's PM-10 planning provisions, if there were a measure or set of measures that were technologically and economically feasible and could collectively generate substantial emission reductions, e.g., one year's worth of RFP, then a state would be hard pressed to justify withholding their implementation.¹²⁵

If we read the CAA to demand that the only acceptable contingency measure are those that are adopted but not implemented, then states face a difficult choice: adopt the controls for immediate implementation and clearly meet the core control measure requirements but fail the contingency measure requirement or adopt the control measures but hold implementation in reserve to meet the contingency measure requirement but potentially fail the core control measure requirements.

However, states do not need to face this difficult choice if we read the CAA to allow adopted and implemented measures to serve as contingency measures, provided that those measures' emission reductions are not needed to demonstrate expeditious attainment and/or RFP. There is nothing in the language of section 172(c)(9) that prohibits this interpretation. This approach to the contingency measure requirement also has the benefit of allowing states to build uncredited cushions into their attainment and RFP demonstrations--which makes actual failures to make progress or attain less likely--while still obtaining the air quality and public health benefits from the implemented measures.

We have allowed this approach--which is effectively the early implementation of contingency measures--in ozone and carbon monoxide plans. See *memorandum*, G. T. Helms, Chief, Ozone/Carbon Monoxide Programs Branch, OAQPS to Air Branch Chiefs, Regions I-X, "Early Implementation of Contingency Measures for Ozone and Carbon Monoxide (CO) Nonattainment Areas," August 13, 1993. In this memorandum, we note that several states wished to implement their contingency measures early even though they were not needed for their attainment or RFP demonstrations and that "[i]t seems illogical to penalize nonattainment areas that are taking extra steps to ensure attainment of the NAAQS by having them adopt additional [replacement] contingency measures now." This rationale applies with equal force to PM-10 plans.

How are these requirements addressed in the plan?

Annual Standard

The revised MAG plan as submitted in February 2000 identifies 5 measures as contingency measures. Table Cont-1 list the measures and their emission reductions as they are

¹²⁵ We do not believe that States are obligated by section 172(c)(9) to adopt infeasible or unreasonable measures or measures that individually and collectively have trivial benefit.

listed in the revised MAG plan. The average annual increment in RFP for the annual standard is 5.5 mtpd/year for the full 11 year period, 1995 to 2006 and 4.4 mtpd/year for the 5 year period, 2001 to 2006. See the section "Reasonable Further Progress and Quantitative Milestones" in this TSD.

TABLE CONT-1 ANNUAL STANDARD CONTINGENCY MEASURES AND ESTIMATED EMISSION REDUCTIONS 2000 MAG PLAN	
MEASURE	2006 EMISSION REDUCTIONS MTPD
Agricultural best management practices	4.2
Off-road vehicle standards	1.0
Cleaning burn fireplace ordinance	0.1
Additional dust control - City of Tempe	0.1
Additional dust control - City of Phoenix	0.1
Total reductions	5.5

Source: MAG plan, p. 8-19.

Since the MAG plan was submitted, Arizona has made to changes to its contingency measure package for the annual standard. First, Arizona has withdrawn its commitment to adopt California's off road vehicle standards in favor of the federal program because the federal nonroad program produces essentially the same emission reductions. See ADEQ's September 7, 2001 letter on California's Off-Road Standards. Second, the State has recalculated the emission reductions for the agricultural best management practices based on the BMP general permit rule as adopted. The revised contingency measures and their emission reductions are given in Table Cont-2.

TABLE CONT-2 ANNUAL STANDARD CONTINGENCY MEASURES AND ESTIMATED EMISSION REDUCTIONS REVISED	
MEASURE	2006 EMISSION REDUCTIONS MTPD
Agricultural best management practices (see note 1 below)	5.7
Off-road engine standards (EPA)	0.9
Cleaning burn fireplace ordinance	0.1
Additional dust control - City of Tempe	0.1
Additional dust control - City of Phoenix	0.1
Total reductions	6.9

Source: MAG plan, p. 8-19.

Note 1 -- Changes in emission reduction estimates for the agricultural BMP rule

The estimate of emission reductions from BMP in the 2000 MAG plan was calculated prior to the adoption of the BMP rule and uses different assumption about the effectiveness of agricultural controls then were used to calculate the emissions reductions from the adopted BMP rule. The 2000 MAG plan assumed a 36 percent overall control effectiveness on windblown emissions from agricultural fields and aprons and a 0.3 percent control effectiveness on in tilling emissions from prohibiting tilling on high-wind days in 2006. The plan did not assume any reductions from other agricultural sources. MAG TSD, pp. V-63 to 64.

Estimated reductions from the BMP rule in 2006 are estimated as

2006 average annual day agriculture tilling/harvesting emissions are 3.8 mtpd (MAG TSD, Table II-3)

2006 annual agricultural tilling/harvesting emissions are: 3.8 mtpd x 365 day/year = 1,387 mtpy

2006 annual windblown agricultural fields emissions are: 4,284 mtpy (MAG TSD, Table II-3)

2006 total annual agricultural emissions windblown + tilling/harvesting: $4,284 + 1,387 = 5,671$ mtpy

2006 total average annual day emissions windblown + tilling/harvesting: $5,671 \text{ mtpy} / 365 = 15.5$ mtpd

Percent reduction from agricultural BMP rule in 2006 = 36.6 percent¹²⁶

Emission reductions from agricultural BMP rule in 2006 - $0.366 \times 15.5 \text{ mtpd} = 5.7 \text{ mtpd}$.

24-Hour Standard

The identified contingency measure for the 24-hour standard is controls for unpaved roads and alleys. BMP TSD, p. 30. This measure comprises not only the unpaved road provisions in MCESD Rule 310.01 but also the commitments by local jurisdictions to control unpaved roads. See MAG plan, pp. 7-75 to 7-94. This measure is estimated to reduce emissions by 12.19 mtpd in 2006. MAG plan, p. 8-9.

The average annual increment in RFP for the 24-hour standard is 10.9 mtpd/year. See page 290 of this TSD.

Does the plan meet the statutory, regulatory and policy requirements?

Annual Standard Contingency Measures

We propose to find that the MAG plan provides for the implementation of contingency measures for the annual standard as required by CAA section 172(c)(9).

All the measures that have been identified in the MAG plan as contingency measures have been adopted and are being implemented but are not credited in the attainment, RFP or milestone demonstrations for the annual standard and are not necessary to demonstrate expeditious attainment of that standard. Under our applicable policies, states are allowed to use implemented but uncredited measures as contingency measures.

Under our contingency measure policy, contingency measures should in total have emission reductions equal to or more than the annual RFP increment. For the Phoenix area, the annual standard RFP increment is 5.5 mtpd. Collectively, the specified contingency measures generate 6.9 mtpd.

¹²⁶ 2006 emissions figures already account for the loss of agricultural lands between 1995 and 2006.

24-Hour Standard Contingency Measures

We propose to find that the MAG plan provides for the implementation of contingency measures for the 24-hour standard as required by CAA section 172(c)(9).

The unpaved road measure that is identified in the MAG plan as contingency measure for the 24-hour standard has been adopted and is being implemented but is not credited in the attainment, RFP or milestone demonstrations for the 24-hour standard and is not necessary to demonstrate expeditious attainment of that standard. Under our applicable policies, states are allowed to use implemented but uncredited measures as contingency measures.

Under our contingency measure policy, contingency measures should in total have emission reductions equal to or more than the annual RFP increment. For the Phoenix area, the 24-hour standard RFP increment is 10.9 mtpd. The specified contingency measures generates 12.2 mtpd.

This section prepared by Frances Wicher.

GENERAL SIP REQUIREMENTS: ADEQUATE PERSONNEL, FUNDING, AND AUTHORITY

Requirement: Section 110(a)(2)(E)(i) of the Clean Air Act requires that implementation plan provide necessary assurances that the State (or the general purpose local government) will have adequate personnel, funding and authority under State law.

Proposed Action: Approve

Primary Guidance Documents: 40 CFR part 51, subpart L (§ 51.230-232) (authority)
40 CFR § 51.280 (resources).

Primary Plan Cites: MAG plan, Chapter 11 “Commitments for Implementation,” Volumes 1-4.
BMP TSD, pp. 33-35.

What are the statutory, regulatory, and policy requirements?

Section 110(a)(2)(E)(i) of the Clean Air Act requires that implementation plan provide necessary assurances that the State (or the general purpose local government) will have adequate personnel, funding and authority under State law. Requirements for legal authority are further defined in 40 CFR part 51, subpart L (§ 51.230-232) and for resources in 40 CFR § 51.280.

States and responsible local agencies must demonstrate that they have the legal authority to adopt and enforce provisions of the SIP and to obtain information necessary to determine compliance. SIPs must also describe the resources that are available or will be available to the State and local agencies to carry out the plan, both at the time of submittal and during the 5-year period following submittal.

How are these requirements addressed in the plan?

Resources

Each agency committing to implement controls described the resources available to implement the controls. See MAG plan, Chapter 11, “Commitments for Implementation” and BMP SIP, p. 34. We have discussed resources for each measure as we have evaluated it in this TSD. The available resources seem adequate for implementing the SIP now and over the next 5 years.

Legal Authority

- The Maricopa Association of Governments (Adoption of the plan): A.R.S. 49-406 H.
- The County of Maricopa, as both a general purpose governmental agency and an air pollution control agency:
 - General purpose government (improve and maintain roads, adopt and enforce building codes, etc.): A.R.S. 11-251 and 11-251.05.
 - Environmental Services Department (adopt and enforce air pollution control regulation). A.R.S. 49-479 provides that the board of supervisors "shall adopt such rules as it determines are necessary and feasible to control release into the atmosphere of air contaminants..." A.R.S. 49-476.01 provides the County control officer the authority to require sources to monitor, sample, or otherwise quantify their emissions and the board of supervisors the authority to adopt rules for source monitoring, sampling, etc.
 - The Cities and Towns of Maricopa County (improve and maintain roads, adopt and enforce building codes): A.R.S. 9-240, 9-243, 9-462
 - The Arizona Department of Environmental Quality. A.R.S. 49-404 and 49-406, authority to adopt SIP, A.R.S. 49-422(B) & (C) authority to require sources to monitor, sample, or otherwise quantify their emissions and to adopt rules for source monitoring, sampling, etc. Authority to adopt specific program (e.g., inspection and maintenance, BMP rule) are described with the measure.

Does the plan meet the statutory, regulatory and policy requirements?

We proposed to find that the implementing agencies for the MAG plan have adequate resources for implementing their respective commitments in the annual standard proposal. 65 FR 19964, 19989. We also proposed to find that the MAG plan also adequately describes the resources that are available or will be available to the State and local agencies to carry out the plan, both now and over the 5 years from submittal. See discussion of the individual commitments and control measures earlier in this TSD and in the TSD for the annual standard proposal.

In our annual standard proposal, we proposed to find that all agencies and jurisdictions appear to have adequate authority under Arizona state law to implement their respected commitments and, where applicable, to obtain information necessary to determine compliance. 65 FR 19964, 19989. While minor changes have been made to several control measures (e.g., the remote sensing program), the State continues to have adequate authority to implement the measures. No other changes have been made to the any agencies and/or jurisdictions authority since we proposed the annual standard.

This section prepared by Frances Wicher.

DESCRIPTION OF THE ENFORCEMENT METHODS AND STATE BACK-UP AUTHORITY

Requirement: Section 110(a)(2)(C) requires SIPs to include a program to provide for the enforcement of SIP measures.
Section 110(a)(2)(E)(iii) requires SIPs to include necessary assurances that where a State has relied on a local or regional government, agency or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of the such plan provision.

Proposed Action: Approve

***Primary
Guidance
Documents:*** 40 CFR §51.111(a) enforcement authority

***Primary
Plan Cites:*** MAG plan, Chapter 11 “Commitments for Implementation,” Volumes 1-4.
BMP SIP, p. 34

What are the statutory, regulatory, and policy requirements?

Section 110(a)(2)(C) requires SIPs to include a program to provide for the enforcement of SIP measures. The implementing regulation for this section is found at 40 CFR §51.111(a) and requires control strategies to include a description of the enforcement methods including 1) procedures for monitoring compliance with each of the selected control measures, 2) procedures for handling violations, and 3) the designation of the agency responsible for enforcement.

Section 110(a)(2)(E)(iii) requires SIPs to include necessary assurances that where a State has relied on a local or regional government, agency or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of the such plan provision.

How are these requirements addressed in the plan?

The principal control measures in the plan are MCESD’s Rules 310 and 310.01 and ADEQ’s BMP rule. Procedures for monitoring compliance (i.e., the inspection strategy) with these rules are described in Maricopa County’s commitments and in the BMP SIP.

MCESD developed by April, 2000 inspection priorities for vacant lots and unpaved parking lots considering lot size and number of sources with larger lots being inspected first and smaller lots in succeeding years. A number of cities have municipal programs to address these sources; therefore, the Department is initially direct its inspections to cities lacking such programs. MCESD inspectors are assigned geographical districts and are compiling notes on the vacant lots and unpaved parking lots in each district during their routine surveillance activities. Under current MCESD policy, the inspectors are first directed to handle all complaints and then to begin to address the larger sites on the individual district lists. In 2000, the inspectors made 499 inspections on vacant lots, unpaved parking lots, and unpaved roads.

MCESD issued a revised air quality enforcement policy on April 28, 2000. See Air Quality Violation Reporting and Enforcement Policy and Procedure, MCESD, April 28, 2000. A copy of the policy can be found in the docket for this action. The policy is one of the commitments made by the Maricopa Board of Supervisors on December 15, 1999, to address EPA's concerns regarding enforcement of the County fugitive dust rules. See Maricopa County commitments, 1999 Revised Measure 6.

The purpose of the policy is to provide a consistent process for documenting air quality violations, notifying alleged violators, and initiating enforcement actions to ensure that violations are addressed in a timely and appropriate manner. See Enforcement Policy, p. 1.

The enforcement policy requires that when a potential violation is discovered, the inspector shall provide details on a compliance inspection report, earth moving site report and a written notice of the violation shall be provided to the owner or operator in a compliance status letter, inspection form, notice of violation, notice to appear and complaint ("citation"). Certain types of violations (e.g., violation of opacity limitations, stabilization requirements, work practices for hauling and trackout etc.) will be referred to the County Attorney's office. A follow up investigation shall be conducted if the violation has not already been corrected at the time of the written notice. Enforcement Policy, p. 2.

Enforcement options are Orders of Abatement, Notice to Appear and Complaint, or referral to the County Attorney's office. The County Attorney's office has the options of settlement agreement with consent decree, filing a criminal complaint under A.R.S. 49-512 and 49-514 or filing a civil complaint in Superior Court. Appropriate penalties will be sought for civil and criminal complaints, and the Department encourages Environmental Community Action Projects as part of settlements to supplement penalties. Enforcement Policy, p. 4-7 and Addendum A.

ADEQ will enforce the BMP rule. It will develop a compliance determination inspection initiative in 2002 by working with various organizations (e.g., University of Arizona, MCESD), ADEQ intends to select a section of the nonattainment area and perform compliance determination inspections. Additional initiatives may be developed depending the results of this initial one.

Starting in January, 2002 ADEQ will respond to agriculture-related complaints within five working days. ADEQ will also work with other agencies to develop a program for referral of complaints. BMP SIP, p. 34.

THE BMP statute (ARS § 49-457 (I), (J), and (K)) and the BMP rule (AAC R18-2-611 (K) and (L)) give ADEQ authority to address agricultural-related complaints and details the compliance steps that ADEQ must follow in dealing with such compliance. BMP SIP, p. 34.

Under the BMP rule, if ADEQ determines that a commercial farmer is not in compliance with the BMP general permit and this is the first complaint against the farmer, then ADEQ will issue a compliance order requiring the farmer to submit a plan to the local Natural Resources Conservation District (NRCD) that specifies the BMPs that will be used in the future. The farmer will have a least six months to submit this plan. ARS § 49-457 (I). ADEQ will develop a memorandum of understanding with the NRCD to obtain copies of these plans. BMP SIP, p. 34.

If ADEQ determines that a commercial farmer is not in compliance with the BMP general permit and there have been previous complaints against the farmer, then ADEQ will issue a compliance order requiring the farmer to submit a plan to the ADEQ that specifies the BMPs that will be used in the future. The farmer will have a least six months to submit this plan. § 49-457 (J). BMP SIP, p. 34.

If the farmer fails to comply with the submitted plan, ADEQ may revoke the general permit and require the farmer to obtain an individual permit. § 49-457 (K).

The CAA section 110(a)(2)(E)(iii) requirement that plans include necessary assurances that where a State has relied on a local or regional government, agency or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of the such plan provision are addressed by A.R.S. 49-406. J. This A.R.S. section provides that if any person fails to implement an emission limitation or control measure, the relevant State official is required to issue a written finding to that effect, which may also necessitate the holding of a conference regarding the failure with the offending person. If a determination is made that the failure has not been corrected, the attorney general, at the responsible official's request, must file an action, seeking either "a preliminary injunction, a permanent injunction, or any other relief provided by law." A.R.S. 49-407 provides that citizens may sue the director to perform his or her duty. MAG plan, p. 7-285.

Does the plan meet the statutory, regulatory and policy requirements?

We propose to find that the MAG plan adequately provides for the enforcement of the principal measures relied on for attainment measures and that the plan includes an adequate descriptions of enforcement methods as required by our regulations.

We have previously found that Arizona law includes the necessary assurances that where a State has relied on a local or regional government, agency or instrumentality for the implementation of any plan provision, the State has responsibility for ensuring adequate implementation of the such plan provision. 60 FR 18010, 18019 (April 10, 1995).

This section prepared by Colleen McKaughan and Frances Wicher.